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## NEWS IN BRIEF

### US warns of long-term ban

PRESIDENT Carter's ban on the export of high technology goods to the Soviet Union could continue indefinitely.

Speaking before a special Senate sub-committee hearing, William Perry, Under-Secretary of Defense, explained that the ban might remain as the Soviet Union was steadily increasing its spending on defence technology. Over the last decade its spending had leapt £31 billion ahead of US military technology funding, he said.

**It's an ill wind . . .**

IN the ill-wind department, IBM's problems with the System 38 database computer have blown Wang plenty of good. The company has been inviting people with System 38s on order to seminars in the US to promote the merits of the Wang VS computer, and so far has picked up orders worth \$17.4 million with an average unit value of \$145,000.

### Dutch contract

THIRD party maintenance firm Data Processing Customer Engineering has been awarded a contract by KLM Royal Dutch Airlines to maintain its twin IBM 309-65 installation at Amsterdam in the Netherlands. The KLM contract is worth £200,000 over four years.

### Link to Bombay

A SATELLITE link to Bombay was established and the British Prestel system was demonstrated to acclaim at the Computer Society of India's conference in the city earlier this month.

## UK companies unite to advise government

A PRESSURE group of British-owned computer industry companies is being formed to advise the government on future procurement policies and of the implications that future GATT and EEC regulations may have on international markets.

The group, provisionally named the United Kingdom Information Technology Association, held its first meeting at ICL on January 28. This was attended by directors representing a wide range of UK companies including Ferranti, ICL, GEC Computers, CAP, BOC Computer Services, Pactal, Data Recording, Kode, SPL, and Penny and Giles.

The meeting was described as "very exploratory" but there was a positive response and the points raised are to be further considered by the individual companies in preparation for the next meeting in March.

Main objectives at present are to prepare for the change in the government's "Atlas power" procurement policy at the end of the year and to be ready for new GATT provisions that are due to come in to force at about the same time.

One reason given for the need for the group was that the Computing Services

Association was not suitable for a lobbying role because it included companies which were controlled and owned by overseas interests.

National Enterprise Board companies Nexos and Immos were both invited to send representatives to the meeting and although Immos director Iann Barron was unable to attend he favoured such a venture. He told Computer Weekly, "There is a need for MPs to have a knowledge of information technology and any mechanism which helps towards that understanding should be supported."

## IBM gives SNA link to VM/CMS users

CONFIRMING the growing importance of the VM/370 operating system in IBM's strategy for the 1980s the company has announced major enhancements which enable native mode VM/CMS users to join the Systems Network Architecture camp.

The announcements, forecast in Software File last month (CW, January 24), comprise four new licensed programs.

Probably the most important is VM/VCNA, VTAM Communications Network Application, which allows users of the VM/CMS Conversational Monitor System to access SNA-based applications on all systems in an SNA network. Additionally, it enables terminals attached to an SNA network to be used as VM/CMS consoles and to use the interactive facilities offered by CMS. VM/VCNA costs £142.80 a month and will be available between October this year and April 1981.

Also predicted and long desired is the VM/PTF Pass Through Facility which enables local or remote CMS users to be dialled into applications or sub-systems running under a guest operating system on the user's own host, or to pass through the host processor to access such sub-systems on a second host. Thus, a bridge is provided between CMS and sub-systems like CICS/VS, and IMS/VS databases.

VM/PTF costs £63.40 a month and will be available in May. VM/SP, Systems Product, is a replacement for both the basic and the full VM/Systems Extension programs and support for these will be withdrawn in September 1981 and March 1982 respectively. VM/SP contains two new functions. A CMS editor with a "powerful" command set, enabling users to write macros for text editing and other applications; and VM support to the 3279 colour display and the wide-screen model five version of the 3278 display. It costs £157.30 a month, compared with £75.80 for basic VM/SE and £785 for full VM/SE.

The announcement is completed by an RSCS Remote Spooling Communications Sub-system. Available in October and costing £39.50 a month, RSCS extends the VM/370 spooling facility to local and remote 3286, 3287, 3288 and 3289 printers.

Welcoming the announcement, Des Lee, chairman of the IBM Computer Users' Association, noted that the association and the big users organisation, Guide, had been pressing for such facilities. "I am pleased to see IBM responding to our wishes," he said.

## Data 100-IAL's joint effort

### From front page

ments, the IAL Gemini packages are intended to be used with little or no modification. Data 100 admits to this contradiction, but still likes the name.

There are packages covering sales ledger, purchase and nominal ledger, stock recording and payroll and they can be purchased individually at prices between £500 and £700.

The 400 series hardware is built by Sycor, the organisation acquired by the Canadian telecommunications firm Northern Telecom not long before it took over Data 100 and set up Northern Telecom Systems Corp. A few 400 series systems are already used by Data 100 customers in the UK for distributed processing and communication with the mainframe, 3270 emulation being one optional facility. Existing systems software includes Cobol and Basic.

The Sycor side of Northern Telecom Systems Corp is developing an addition to its 400 series of distributed processing systems called the 485 that will employ the 16-bit Intel 8086 microprocessor. The existing 400 series machines, the 405 and 445, are based on multiple Intel 8080 processors. The smaller 405 can have up to two VDUs and one million bytes of floppy disc storage, while the bigger 445 comes with up to eight VDUs and can support hard disc drives. The 485 will extend these capabilities while retaining software compatibility.

## UK firms in race to buy GA

### From front page

market, process and industrial control. General Automation is also in the factory data collection and environmental control markets, where Burroughs is not a major contender.

One factor likely to hamper any Thorn bid for General Automation is the effort the company is having to put into sorting out the problems at EMI,

which it acquired late last year. Thorn is currently trying to secure the future of the loss-making EMI medical scanner division, either through outright sale or a joint venture, but emphasises that any solution, which would have to assure the future of both staff and customers, is unlikely to be found for several weeks. Talks have been held with US and other companies in the medical electronics field.

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## NCC studies computer-assisted training

A STUDY of computer-assisted training in industry is being carried out by the National Computing Centre with a view to setting up a training centre for the industry.

The study is being carried out by a team of consultants and is expected to be completed by the end of the year.

Training costs can be a major problem for many firms, and the NCC is looking at ways of reducing these costs.

Using computers to train specific jobs is different from computer-assisted learning, he points out. The machine-based method is an optional extra to existing procedures.

The aim of the study is to develop a checklist of features which systems can and ought to have, according to the kind of training required.

The study is intended to last six months, after which workshops for potential users will be set up. It is hoped that the study will find out just what people doing already, and what they would like to do.

Anyone wishing to contact the NCC, Prudential Buildings, more Row, Birmingham B2 2DQ, should call 021-236 6283.

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## Briefing

### EEC £9m support plan

SOFTWARE and systems companies are being invited to apply for financial support for computer projects from the EEC Commission. At present, £9 million has been allocated to the scheme. Projects should be socially, environmentally or commercially "useful".

Each project should involve at least two users or companies and should further EEC objectives aimed at implementing standards, portability and conversion. Support will be in the form of interest-free loans of up to 50% of the cost for the development period and the first two years of implementation. Loans will be repayable with interest out of profits earned.

### Receiver at HPAC

A RECEIVER has been called in at Oxford software house HPAC whose Fortran 77, Coral 66 and BCPL compilers are sold by Computer Automation on its Naked Mini computers (CW, July 19, 1979). There were plans for a Pascal compiler and finishing touches to an RTL/2 compiler will probably have to be made by Computer Automation itself.

### Dick's WP buy

GEC's US office equipment company A. B. Dick of Chicago, is reported to be buying the manufacturing rights to a shared-logic word processing system manufactured by Henrich Electronics of Nashua, New Hampshire. Called Magna SL, the system is already marketed by Dick.

### Surrey's second

A SECOND Univac 1100/80 system, valued at £1.8 million, has been ordered by Surrey County Council for use in developing departmental services and a larger terminal network.

### Blid withdrawn

PARADYNE has withdrawn its bid for UK communications manufacturer Case, and is seeking to renegotiate terms of the takeover. The reason is that the offer made last autumn was all in Paradyne shares. Since then the Paradyne share price has risen so much that the \$11 million bid is now worth \$19.25 million and Paradyne thinks this is too much.

### Compelec sold

COMPELEC, which went into voluntary liquidation last month (CW, February 28), has been taken over by Beam, part of Unilever. The London centre for Beam, based on the Compelec remains, will become the headquarters for the operation. There are also centres in Manchester and Cheltenham.

### WP launch

VYDEC is launching a new version of its full-page screen word processor, incorporating new software. Called the model 1800, the new machine will sell for about £850.

## Second £25 million lined up for Immos

THE long-delayed second £25 million for the NEB-backed semiconductor company Immos could be announced today (Thursday) or tomorrow. And an announcement on the company's application for an Industrial Development Certificate for its first factory in Bristol may be made at the same time.

If the money is eventually

granted, it will be made against a background of political rows between the NEB, the government, and regional groupings of MPs. There are even suggestions of a minor Cabinet split over the funding of the company, and the Bristol site.

The rows revolve around the siting of Immos's first factory. Ministers in the last Labour government, including ex-Prime

Minister James Callaghan, have called for the IDC application to be rejected because the company is not located in an assisted area. The ex-Ministers say they received a commitment from the NEB to do this, but the company states that it never gave such a commitment.

Industry Secretary Sir Keith Joseph has said that the decision on the actual location of the

company's factory is a matter for the NEB and Immos, and that he has no power to direct Immos where to go.

Where Immos does go if the IDC for the Bristol factory is turned down, is a matter of some conjecture, and it is possible that it could get the money but not the certificate.

The company does not have an official alternative site.

## S Africans take over CAP subsidiary

A 60% share of CAP SA, the South African subsidiary of the British software house CAP-CP, has been bought by the P-E Consulting Group in Johannesburg. The group is an independent associate of the P-E Group of Egham, Surrey.

The move gives CAP SA independent control in its South African operations, solving the long-distance control problems between parent and subsidiary.

CAPSA has also suffered from the high turnover of staff in the competitive South African software market, a problem which the limited support from the UK could do little to solve. The relationship with P-E is aimed at giving staff stability and job security.

Jim McAulay, managing director of CAPSA, said that the group had been involved in the deal, commented, "The sale was the best of a number of options. Our

● Turn to back page

## CW jobs go on Prestel

COMPUTER WEEKLY this week launches a job advertising service on Prestel through its sister company IPC Viewdata.

A trial using advertisements reproduced free from our pages has been run since Compex last November, and now the pages are to be charged for at £75 a week.

Access is via IPC Viewdata's main index on page 456 or straight to today's computer jobs on page 458074. From there users are routed to individual job advertisements or to previous days' summaries.

Prestel now has 2,450 users of which 1,520 are business users in the London area. Domestic users number 414 in all, and 276 in London.

## 2903 replacement next week

REPLACEMENT for the highly successful ICL 2903 is set to appear on March 20. Known in the company under various code names such as the 2903B and M1, the machine is expected to offer the power of the 2904/50 at the price of a 2903/40. First deliveries are scheduled for June. A field-upgradable model which will supplant the 2903 with first deliveries in January, 1981, may also be included in the initial launch.

Most interesting feature of the new system is likely to be the operating system. ICL is expected to announce an enhanced version of the 2903 Exec, code-named EMOE 30, and to follow it with Super EMOE later this year (CW, December 13, 1979).

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## Three buses on mini

THE use of three buses is the most striking feature of the new SEMS Mitra mini, announced in Paris last week, as the Mitra 525. As exclusively reported in Computer Weekly the mini uses the high speed Motorola 10800 emitter-coupled logic bit-slice microprocessor.

The chip is also used in the Univac 1100/80 mainframe, but the Mitra 525 is believed to be the first minicomputer built around it; it is also the first bit-slice processor from SEMS.

The three buses, which look like a single bus to the user, include a memory bus, taking 64 or 128K-word modules of MOS memory; a peripheral bus to which are attached input-output and communication processors; and system bus.

The Mitra 525 features an 8K word cache memory and is designed to support remote diagnostics. A basic processor with 128K-words of memory costs £250,000 (about £27,000) and configured with console, 50 megabytes on disc (tape unit), 300 lpm printer, four video terminals and a four-line communication

coupler costs FF 624,000 (about £88,000).

SEMS in the UK is concentrating on the Solar line and is unlikely to announce the 525.

## INSIDE THIS WEEK'S CW

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Flagship of the Norwegian computer industry is Norsk Data whose Nord range of minis has won many a prestigious European prize. Kåre Jones looks at the development of the company and its place in the Norwegian economy. Page 18	
<b>PALMER IN INDIA</b>	
The computer industry in India may be small in world terms, but many companies in the subcontinent are winning a strong foothold in the high technology business. In his first report Tim Palmer looks at the progress of ICL's partner IOIM. Page 19	
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## COMPUTERVIEW

## H foxes IBM watchers

IBM watchers are in disarray over when the company will announce the first model or models of its H-series or Adirondack which will succeed the 303X line.

The Gartner Group of New York believes the first machine could appear as early as this month, while Daniel Mandresh of New York brokers Merrill Lynch Pierce Fenner and Smith believes it will be "later rather than sooner", adding that the company has probably not made up its mind whether it will be in the last quarter of 1980 or the first quarter of 1981.

A US publication, Computer Marketing Newsletter goes for a May launch of one model and suggests it will be a dual processor 3033 built in new technology. But the same publication offers what appears to be evidence against an imminent launch: it says that while General Systems Division salesmen have been given much bigger sales targets for 1980 than they had in 1979, Data Processing Division targets are substantially unaltered.

A dual processor machine would imply that IBM is rewriting the MVS operating system for more effective multiprocessor working; otherwise such a machine would offer little more than the Attached Processor version of the 3033 which is already available.

There is also disagreement on whether there are four or five models in the line; it would be usual for more models to be in development than will actually be announced. Code names identified for various models include Catalin, Iroquois, Marcy, Sentinel and Baldin, with Iroquois the favourite as the first to appear. A power range of three to four million instructions per

second at the bottom to 15 or 16 at the top is postulated. IBM does not at present have an effective counter to the Amdahl 470V/8, so a machine offering about 40% more power than the 3033 would be an appropriate addition.

The various processors are apparently being developed by different teams in various locations, as was System 370. This implies that there will again be little capability for field-upgrading from one model to the next.

Another question still unanswered with any confidence is what kind of cooling will be required. All the competing machines at the top end from Amdahl, Hitachi and Fujitsu are air-cooled, whereas the 3032 and 3033 are water-cooled. Some observers, including Amdahl, believe that this will continue in the H-series, while others have suggested that Freon gas will be used as the coolant.

Observers are also waiting for IBM to activate the latent power of the 3880 disc controller, which has been rated as comparable with a 370/145. A significant

improvement in performance could be achieved by moving much of the disc administration out of the CPU and into the 3880, and to offer the new large Wharfedale disc, launch of which is thought to be imminent, which 3880 on a new machine would give a substantial advantage over the 303X line even if the CPU were to feature this uncertainty. Clearly a good leasing contract, sound insurance against sale prices of 303X machines, 3031s and 3032s are particularly vulnerable, but prices are by no means innume.

For users who need more IBM power in a hurry, the 370/158s look like a good bet. A 2-megabyte 158 with three channels would cost about £250,000, compared with £450,000 for a comparable 3031. The 158 is active in that it does not need water cooling.

For those looking for further clues to the likely launch date of the H-series, IBM has said that it is likely to go back to the money markets for further loans, and the money will be required mainly to finance lease companies are leasing 303X machines rather than buying them because of the uncertainty about the H-series, and if IBM expects this to continue for more than 1980, it suggests that the launch is not imminent. On performance, too, IBM announcements can normally be expected "later rather than sooner", so most of the evidence points to late 1980 or early 1981 for the H-series.

## LETTERS to the EDITOR

## Fortran standard Small can be dangerous..

I CAN assure Messrs Bailey and Vallance (CW, February 28) that suggestions similar to their own, that ANSI's X3J3 committee should hibernate for a few years before embarking on another Fortran standard, have been made in standards circles — sometimes with considerable vigour! I have two comments.

Firstly, even if X3J3 wanted to hibernate (which, agreed, it does not), it would not be allowed to because of the demands being made on it — a point I indicated in my article.

Secondly, as well as standardising existing practice (or, more usually, trying to reconcile different existing practices), there is a lot to be said for trying to provide a standard to meet the needs of current known developments — for trying to stop the portability problem getting worse, if you like. Providing standard handling facilities, before the variants proliferate, is an obvious example. I hate to think of the shambles there would be in a few years, in that area alone, if X3J3 did hibernate.

Core-plus-modules is an attempt to bring some kind of long-term order and control into Fortran development, to cope with a number of such develop-

ments. With luck, "core" Fortran will prove to be a compact (fairly) modern, general-purpose language, stable from revision to revision, still recognisably Fortran and with the Fortran virtues, and adequate for most purposes for which Fortran has always been used.

The existence of modules need trouble the average Fortran programmer no more than the existence of subroutine libraries does now. Which brings me to my last point. I can assure your correspondents that in designing the core-plus-modules architecture, the existence of the CALL mechanism has not been forgotten.

BRIAN MEEK  
Queen Elizabeth College,  
University of London.

THROUGH your columns may I express some horror at the current developments in the small computer market. Many small businesses have now got the firm impression that for less than £3,000 they can buy a computer system which will take care of all their requirements.

At an exhibition recently I was talking to a salesman for a small system which is to be offered with a 10-megabyte Winchester disc. My query about back-up was met by the reply that Winchester discs do not go wrong. While I am quite prepared to believe that the reliability of Winchester discs is several orders of magnitude better than conventional discs I do not believe they will provide protection against either a

faulty program or an operator error. So what happens the day the statements are to be run off and the operator accidentally wipes out all the files on the disc?

The likely customers for £3,000 systems are small businesses with no previous experience of electronic business systems. They will therefore require a lot of after-sales support. Who is going to pay for that support?

There is a very serious danger that 12 months from now there will be widespread stories of small companies which have

gone bankrupt because of failure of their small business system. Unfortunately the public and backslash will all of us in the business and not the "get rich quick" men who oversell underpowered items.

I appeal to all responsible people in the computer business to warn anyone they come into contact with of the dangers of committing their business affairs to computer systems without ensuring that there is adequate back-up in all areas.

R.F.10  
Sale, Cheshire.

## Fancy dress banned

WITH reference to the Downtown item on the poster displayed in the Hong Kong metro (CW, February 21), the sign on the bus stop right is to advise people that fancy dress and processions are prohibited within the metro premises. The dragon is a well-known part of Chinese mythology.

What is more amusing about

the poster itself is that the advertising campaign created for the Mass Transit Railway entitled this poster as "Do's and Don'ts" — yet it is all "Don'ts" and nothing positive.

CHRIS RYAN  
Group Services Division Manager  
Mills & Allen Communications  
London W1

## Was Zuse an Olympian?

IN his article on early computers (CW, February 14), Donald Michie quotes Zuse's Z3 as being the first electromechanical digital computer, in 1941. However, Stibitz Model One was operational from January, 1940. What did the Z3 have to warrant the accolade that Model One didn't?

D. CUNNINGHAM  
EDP Audit Manager  
Abbey Life,  
Bournemouth.

Donald Michie replies: The Stibitz Complex Number Computer, retrospectively known as the Model One, allowed a single operation at a time in complex arithmetic (initially just multiplication or division) involved in desk calculator style. It did not in itself incorporate any notion of executing a pre-set sequence of such operations, nor of

altering or extending the repertoire of available operations, for example by plug-board programming, nor did it have a store.

In logical essence, then, it was an electromechanical calculator. The innovative quality, impressive for the time, resided not just in the calculative use of telephone relays but also in the machine's ability to be used remotely over a telex link.

1984 and all that...

THIS week's example of the strange things people say about computers was sent in by Ian Fisher of Intereurope Technical Services, Wokingham, who wins £5.

Max was a genius with computers. He would sit before the console board and play the machines like a virtuoso. It did not matter what language the computer had been taught, for Max spoke all of them. He talked to digital computers and low-level and high-level language computers. He was at ease with FORTRAN and PASCAL IV, the giant IBM 370s and the PDP 10s and 11s and ALGOL 68.

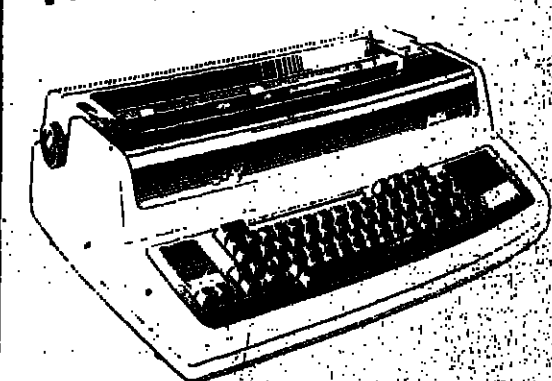
He was at home with COBOL, programmed for business, and BASIC, used by the police, and the high speed APL, which converted solely in charts and graphs. Max talked to LISP and APT, and the PL-1. He held the CPU units, and the high-speed printer answered his questions at the rate of 1,100 lines a minute.

Max Morning and the computers had a wonderful rapport. They did not laugh at Max's accent, or the way he looked, or dressed. To the him, loved him. They happily gave up their secrets to him, sharing their delicious gossip about the fools that mortals made of themselves. It was like old friends chatting.

from Bloodline, by Sidney Sheldon

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## UK industry sets up lobby group



JOHNSON... "We don't want a French lamb situation arising in relation to British computers."

## Bureau develops PoS systems

A POINT-OF-SALE system based on the Chubb Cash CR3/220 terminal has been developed by the Scan Data bureau. The system features a Consort 128K processor, a dual disc drive, a Regent VDU, an Okidata matrix printer and the Chubb terminals.

THE lobby group planned by UK-owned hardware manufacturers and service companies (CW, February 28) has now been formally set up. The name is the United Kingdom Information Technology Organisation, and the 12 founding members include ICL, Nexco, GEC Computers, Ferranti and CAP.

The formal objectives of the group are "To advise the UK government and Parliament, and other public bodies and European institutions, on matters relating to the UK-owned and controlled computer industry which are of political, commercial and technological significance, and which may affect national policies; and to monitor the implementation of international trading arrangements so as to ensure that any discrimination against UK interests is challenged and removed, and to ensure that UK-owned and controlled organisations are offered fair opportunities under these arrangements."

UKITO's most immediate concern is the proposed changes to the rules of GATT and the EEC to make public sector purchasing in all participating countries open-tender. Said one of the founders of the group, "There is no way the French government would genuinely go open-tender but there is a chance the UK government would." This would

be harmful to UK suppliers. Harry Johnson, sales director at Ferranti, who is UKITO's first chairman, said, "We don't want a French lamb situation arising in relation to British computers."

The group will also take an interest in the government's support policy for the UK computer industry. It emphasises that it is not a trade association, and that BETA and the CSA are performing this job adequately. But it was felt these bodies could not be real UK lobbies because they include foreign-owned firms.

Doug Eyeions, director-general of the CSA, disputed this reasoning, commenting to Computer Weekly, "UKITO may generate a demarcation dispute between British-based and British-owned companies which will introduce a confusing and divisive role in the computer lobby."

Eyeions continued, "If UKITO does not intend to play any part in the main lobby, but sees its role solely as drawing attention to the preferential support required for its members in the face of future EEC and GATT procurement regulations, it could be counter-productive in the most important task of making British industry more competitive."

It will be open to other companies to join UKITO if they wish.

## BBC experiments with radio data signals

THE BBC is conducting trials involving the transmission of a data signal with audio programme material on radio broadcasts.

The European Broadcasting Union is discussing standards in the VHF band with national organisations which are working on systems for transmission at around 1,200 bps, but in the medium and long wavebands the BBC is alone.

The BBC wants to develop applications for a signal at 25 bps. Uses could include feeding a

display on the radio with the time or the name of the station to which it is tuned.

The trials include one with the Central Electricity Generating Board in which electricity meters and cheap rate appliances in CEBG employees' homes are turned on and off from the power station, enabling off-peak loading to be increased.

This experiment prompted a question in the House last week from MP Gwilym Roberts about the "Big Brother" aspects of the idea.

## BCS award winners to present papers

WINNERS of the three categories in the 1979 British Computer Society Awards will present their papers at the Royal Society in London on April 23.

The 1979 awards were divided into three parts: high speed computing, job matching and effective distribution.

Category One, for achievement in the technical develop-

ment of computing, was won by the Distributed Array Processor developed by the Research and Advanced Development Centre at ICL.

The second category was won by the Computer Assisted Placing in the Areas of London, CAPITAL, project, which aimed to use computing to improve the standard of job matching in the London area.

A new award for achievement in an application of computing that is imaginative and effective was won by the British Shoe Corp (Footwear) Division for the development of a computer controlled printing system built around a laser printer.

Tickets for the function are available from the BCS. Tel: 01-637 0471.

## ICL unions call for shorter week

UNIONS in ICL are demanding a shorter working week.

At present staff work between 37 and 44 hours a week, depending on their function, but the joint staff trade unions are expected to ask for a significant reduction over the next few years.

It is the first time the unions, which include ASTMS, APEX, AUEW/TASS, and EESA, have put forward a claim of this nature by itself. Previously it has been lodged as part of pay and working conditions claims.

In a report outlining the case for a shorter working week, ASTMS national officer Tim Webb says "After a period of uncertainty in the early 1970s, ICL's results, with government support, have been extremely

good. "This has resulted in benefits to shareholders and, after pressure from their recognised trade unions, employees have managed to extract financial rewards."

## Storage Tech launch to rival IBM 3880

AT the announcement of his company's answer to IBM's new 8809 tape drive, Storage Technology Corp chairman Jesse Awelard revealed that an intelligent controller, expected to be launched at the end of this year, 3880, would be launched at the end of this year, and that a high performance disc system would be available for first shipments in summer 1981. With a price in the region

"However, for a company with a vested interest in change and new systems of work, ICL has shown reluctance to give real consideration to shorter working hours for its own employees."

of \$143,000, the STC 4500 tape unit comes in 75 and 125 ips versions.

**Trafford expands**  
PLANNING to extend terminal services to user departments, Trafford Metropolitan Borough IBM 370/138 to a 4 megabyte 3031 costing £500,000.

## HP SOURCE

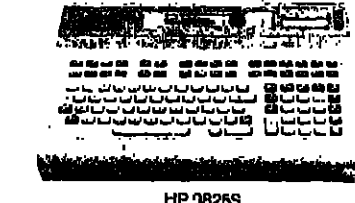
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## Downtime

by Chad

## Back to zero at the Post Office

I FONDLY imagine that the way to find out everything there is to know about something is to go right to the top. Sometimes my illusions are shattered.

I was talking on the phone the other day to Professor James Merriman, until recently member for technology of the Post Office board.

A noise of pips interrupted our conversation for a few seconds, after which Professor Merriman commented, "That's a new one on me. I haven't heard that before."

Well, sir, if you don't know what is going on in the telephones on our earth does? The obvious answer of course is, nobody.

Am I being unkind? Probably. Still, the Post Office does seem to have this knack for defying the laws of logic, or even of mathematics.

An acquaintance of mine who lives in Chorleywood has been told he can't have a phone because they have run out of phone numbers. Now I seem to remember being taught in maths lessons yonks ago that the set of integers is infinite. I could understand it if our wonderful PO had run out of

bits of wire or holes to feed them through, owing to the worldwide shortage of bits of wire and holes. But to run out of numbers? Another historic British achievement.

What you do not realise, of course, is that in parallel with this the Common Market has as well as the Butter Mountain a Bits of Wire Mountain and a Holes Mountain. These are having to be given away to the Russians because the BPO is too proud to accept charity. We have warned the Russians we won't stop sending the stuff until they get out of Afghanistan.

Admittedly, we have made more constructive programs to help the kids with their English and German homework.

Last autumn I had seven Japanese visitors at home for an evening meal, all computer people. As a gesture, I taught the Apple to speak in Japanese for them. I think it was the first time they had heard a computer even try to speak Japanese.

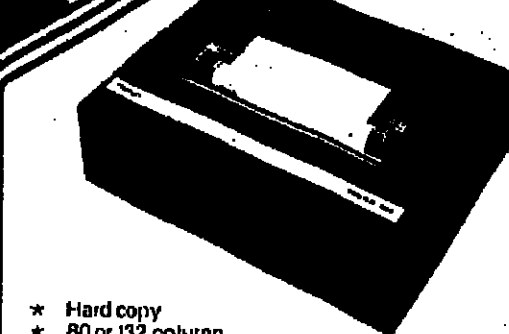
As they were finishing their this company's machines. Think of the temptation on the firm's engineers and software support people to make a few minor adjustments when no one is looking!

If IBM loses the case because of the machine, it really would be an instance of a gunsmith being shot with his own product!

● Talking of IBM, The Times described the other day as "International Business Machines Corporation of Pittsburgh". Does anybody know anything about this firm? Think it might be worth investing a job or two in?

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## GILB'S MYTHODOLOGY

AT an Amsterdam pub, the "Hoppe" at Spui Street (where else do you think I get inspiration for this column?), I met a charming fellow teetotaler who, upon learning that I had an Apple Computer at home (I wear a sign on me from New York saying "I love the Big Apple"), confided in me a most intriguing tit-bit.

At the Dutch Space and Aeronautics Research Establishment they have an Appletek. In Dutch it is probably called an Apple-theek, since the analogy is with a library (bibliothek).

It has about five Apple II computers which are lent out to employees for up to two weeks at a time. There are about 50 research workers involved and this service was reported to be quite popular. The computers could be taken home, and the only obligation was to write a report telling what use had been made of it.

Now isn't that a nice idea for your computer installation? After all you and your family will love to try to beat the Microchess program.

My boys recently forced me out into the unknown area of colour and sound computing by insisting that we made a psychedelic Russian Roulette game (the pistol cylinder revolves in colour, saying click, click, while you wait in tense suspense to see if the multi-coloured bullet is fired or not).

Admittedly, we have made more constructive programs to help the kids with their English and German homework.

Last autumn I had seven Japanese visitors at home for an evening meal, all computer people. As a gesture, I taught the Apple to speak in Japanese for them. I think it was the first time they had heard a computer even try to speak Japanese.

As they were finishing their

## How hobby systems can inspire DP professionals

coffee, I sat down at Apple, next to them, and loaded my kids' homework program with Japanese-English phrases from a Berlitz booklet. I then proceeded to try to improve my score for recognising Japanese phrases, to show my guests a new way to learn Japanese.

Admittedly the home computer does lead to excessive experimentation such as this. We try to do things just to see if they can be done, without due regard for the cost-effectiveness of doing them.

But we do learn and get ideas about what is possible with computers. Admittedly there is a tendency to escapism. What we do at home with the computer must not resemble the kind of thing we are obliged to do at work.

Undoubtedly, many readers have, or soon will have, their own hobby computer at their own expense. But who knows, maybe this is an idea for a new kind of hidden "perk."

A home computer for the DP professional, at company expense, is probably a justified expense. Yet after hours it can give pleasure to the employee and his family.

The company can afford to

give first-class equipment and software to the employees, which the majority of us perhaps cannot yet afford. Perhaps we will shortly start seeing job adverts which list an Appletek or Pet library for employees as one of the many benefits of employment in the company.

There is the aspect of encouraging employees to develop their skills at their own expense and time. Yet who knows, maybe that operator who so sorely wants to break into programming can be given a chance to develop and demonstrate his or her skills and, if these are impressive, he or she should be given a chance at the new employment.

Perhaps the systems analyst has been so busy analysing that he or she has lost touch with what is really practical and possible on computers. Maybe playing with a hobby computer would encourage them to develop their skills, and would generate some ideas of far more user-friendly interactive dialogues.

There is a lot of junk among the programs offered to hobby users. But there are some examples of human engineering which are far superior to the



Tom Gilb is an independent consultant, lecturer and author on computer topics.

stuff regularly served to usual business or technical of larger scale software.

Maybe some of our "bosses" should borrow from the hardware/software library (Computerware Library) to might develop some ideas more professional programs by others at work. Or they even make some of their tools, and relieve some of pressure on the professional programmers.

And maybe the "boss" should play with a home computer company expense. Even a game of chess should do his wits.

There is a danger that the will get too involved and he knows all the answers. I think the boss would be from the exposure.

I'll never forget the Operations and Methods manager, London firm who told me when he found out it cheaper to buy a hobby computer than to go through (E800) formal purchasing, edures, he bought two.

One was for the manager while the other was himself. It was cheaper deciding whether or not to

## CAFS flexibility key to ICL's first sale

THE inherent flexibility of ICL's CAFS 800 data storage system was the key reason for the Central Selling Organisation of De Beers becoming the first customer for the back-end database system (CW, February 21).

CAFS, Content Addressable File Store, is a hardware file search system which runs as a back-end processor to an ICL mainframe. At present only ICL 1800 and DME software is written, but verifications are being written for the ICL VME operating systems.

"All the software database systems which we

looked at were relatively unbalanced," a CSO spokesman explained. "They supported either rapid input and updating, or rapid retrieval, but nothing else provided what we need, which is both. CAFS imposes no software overhead on the mainframe, which is important because we suffer from an excess of disc accesses with many users in contention for information, and CAFS allows us to subcontract the disc transfers to the subsystem."

"We also found that conventional databases were rather cumbersome, particularly IMS, and imposed a big staff and resource overhead which will not be needed with CAFS."

Another attraction was that CAFS fitted in with CSO's existing ICL 2080 running under DME; the organisation also has a number of 2803s and 2804s.

"Most important of all, we needed an enormously flexible system, and CAFS meets this requirement very well," said the spokesman.

Another idea being considered at CSO is the use of CAFS for fast searching of text prepared on a word processor. No decision has yet been taken on this.



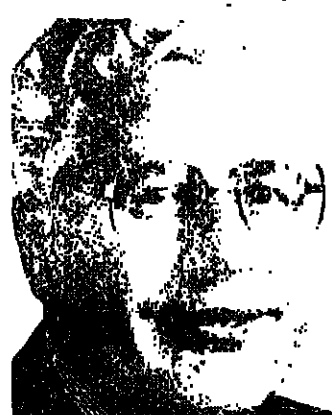
## Introducing the IBM 5120 . . .

By repackaging its 5110 processor IBM has produced the new 5120 which was announced last month (CW, February 28). Gone are the cassette tapes which were standard on the original 5100, gone is the tiny screen, and the box is altogether more substantial than its predecessors.

IBM has confirmed that the 5120 supersedes the 5110 and offers comparable facilities at a substantially lower price. For

£5,577, the user gets the processor (unchanged from that used in the 5110), with 16K-bytes of main memory, two 1.2 megabyte floppy disc drives and keyboard. Software is extra, and getting the Basic interpreter, 16K more memory and an 80 cps printer brings the price up to £5,200. Also available, as with the predecessors, is an API interpreter, and first deliveries are set for this month.

## Park to be 'active' IDPM chief



Park

## BBC Data company launched

THE BBC has launched a company called BBC Data which will investigate ways of selling information from its collections.

These include 21 million Press cuttings, six million photographs, all news bulletins broadcast on television, radio and external services, documentary scripts and indexes of subjects such as pronunciation, international affairs, poetry, drama and music.

BBC Data is already an information provider on Prestel International and is looking for the best way to make its information available in machine readable form.

## Online moves

CONFERENCES and exhibition firm Online has moved from Brunel University to Argyle House, Joel Street, Northwood Hills, HA6 1TS. Tel. 09274 28211.

## Blowing hot and cold in the DP room

as, presumably, to their male colleagues. Long-flowing hair is no friend of the computer environment and is best tied into buns, preferably with industry approved types of string.

The meeting lost little time in zoning into certain small business system salesmen who, by implication, suggest that any odd office corner would be suitable for their machine, providing that a power source is reasonably close.

That the selected site is either permanently cold and draughty from being sited by the back door, or amply hot due to close proximity of the boiler room, is not of major concern to the supplier. His tolerance level is evident only during the sales proceedings.

Such sales practices were strongly condemned by one of the speakers, Terry Benson, Prime Computers' northern area field manager. His organisation, far from encouraging the installation of small minicomputers in abandoned coal sheds, was in fact encouraging the installation of small minicomputers in abandoned coal sheds, was not work together.

Similarly interfacing computer systems with high temperatures and humidity is a critical path to damaging component tolerances and computer data.

According to Prime, the UK office presents more problems

than its US counterparts where air conditioning is a standard feature of company life.

Benson related that it was not exactly unknown for some small systems to have to be switched on one hour in advance so that they could warm up.

Similarly emphatic on the topic of computer environment was Les Hedley, UK marketing manager of Wright's Air Conditioning. There was, Hedley said, still a lot of ignorance where the computer environment was concerned.

For a start, few DPs fully conversant with regulations as the Health Safety Acts and local regulations.

Far from being a requirement, the computer room was a specialist which presented as many more, technical features as computer configuration.

Should a subsequent be held on a similar topic, IDPM would be well advised to issue in advance copies of physics.

Of particular interest would be the measurement of generation from the operation when the air conditioning plant goes on the blink.

## Main contractor

IN a Software File story system at Northwick Park, Harrow, Middlesex (CW, February 28), it was not made clear that the main contractor in the project was Plesey Communications Systems.

## 10 years ago

From Computer Weekly of March 12, 1970.

ROLLS-ROYCE was principal sponsor behind plans for the creation of a European computer services group, known as Systems International, whose aim was to ensure that a significant share of the booming market for computer services remained in European hands. To meet the demands of extra business, the Post Office installed five Leo 328s worth over £2 million at the National Savings Bank, the National Data Processing Service and at a new centre in Bristol. . . . A time sharing system introduced by Philips was in fact the Honeywell H1646 under another name. The Computicket entertain-

ment booking service, owned by Computer Weekly's parent company IPC, was formally secured by Sports Illustrated. . . . A joint agreement was signed between the two companies for the exchange of data. . . . For more information on registering for the Local Computer Networks Conference, please complete the coupon and return to Jan Devon, Regent House, 80 King Street, Telford, Shropshire, Middlesex TW1 3SH, England, or call 01-691-4951, or telex: 8814082 Cyber G.

## LEARN ABOUT LOCAL COMPUTER NETWORKS

FROM THE MAN WHO INVENTED ETHERNET

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- Existing and planned local computer networks, including a number of different Ethernet systems, and CATV networks.
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- Local computer-communications protocols and their relationship to remote-computer-communications protocols.
- Interfacing of local and remote-computer networks stressing the role of gateways.
- Models and measurements of traffic and performance and their implications on design.
- Standards and the strategic value of compatibility.
- Underlying technologies, including LSI, fiber optics, CATV and software structures.
- Integration of terminals, voice, video, and other application in electronic mail and information systems.

Dr. Metcalfe created Ethernet and has worked extensively with Arpanet and Fibernet. He will be assisted by John F. Schoch, an expert in local computer networks from the Xerox Palo Alto Research Center, California.

For more information on registering for the Local Computer Networks Conference, please complete the coupon and return to Jan Devon, Regent House, 80 King Street, Telford, Shropshire, Middlesex TW1 3SH, England, or call 01-691-4951, or telex: 8814082 Cyber G.

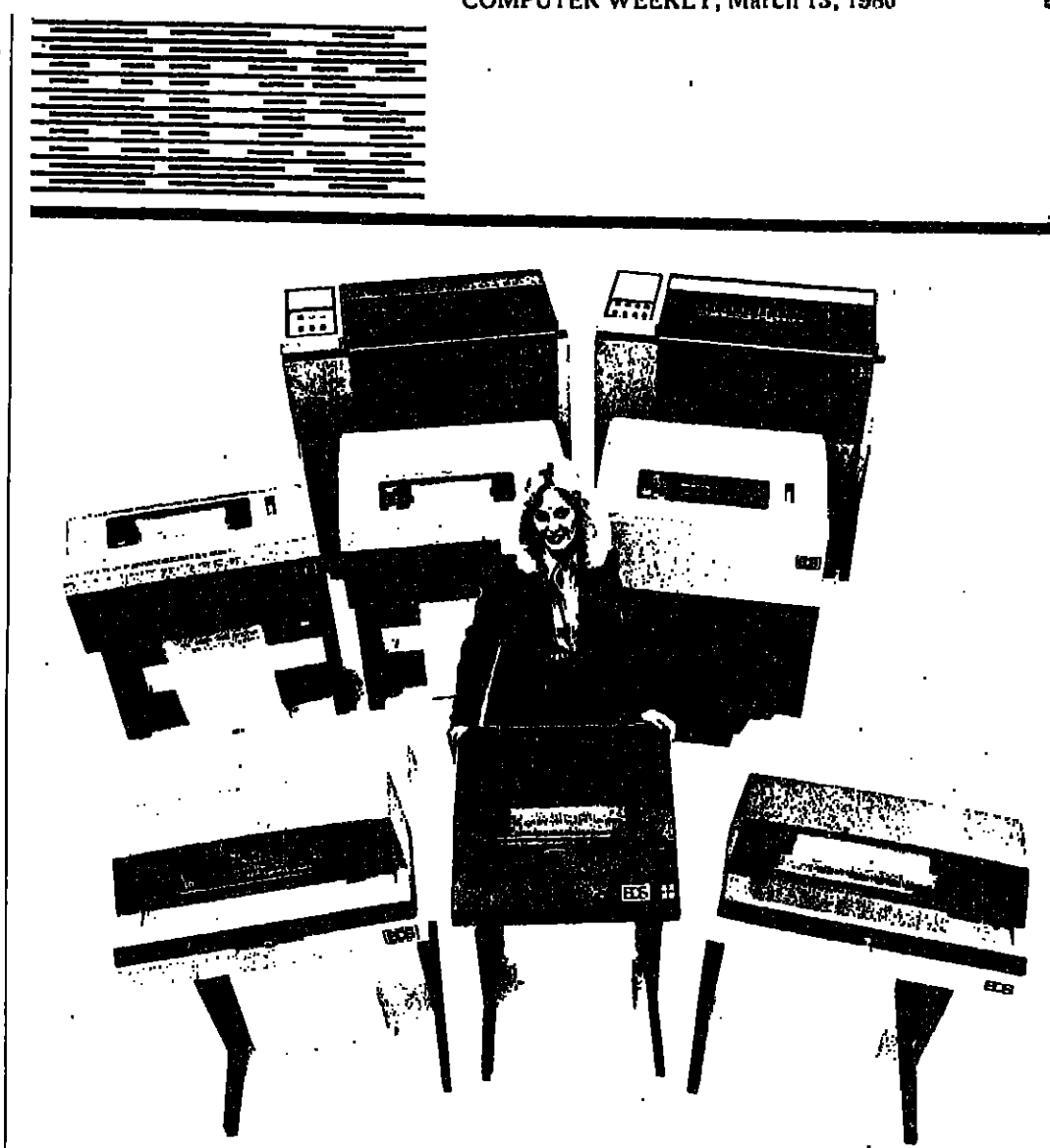
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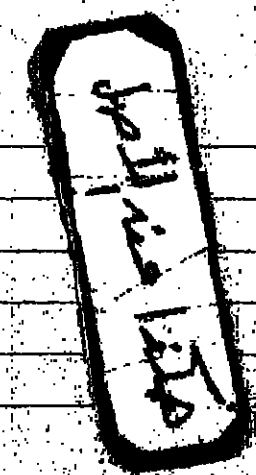
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## Concise and readable guide

MANY books are now available for programmers which provide instruction and advice on various aspects of their craft. A Guide to Good Programming Practice, by Brian Meek and Patricia Heath, however, goes one step further than most in that it covers virtually every aspect of programming in a concise and readable form, with advice from ten specialists from industry, education and commerce.

Problems investigated include analysis, de-

sign, testing, debugging, selection of a language and the use of language standards, program documentation, maintenance and teamwork.

The book is not specific to any particular language and is intended to be read in conjunction with a language manual or textbook. Guide to Good Programming Practice, by Brian Meek and Patricia Heath. Ellis Horwood Ltd, Market Cross House, Cooper Street, Chichester, West Sussex.

## Personalised extensions to Cobol 'dangerous'

MANY readers have expressed interest in last week's article about the company and language named Cobra and the general success of software generators.

But it appears many people use software generators so efficiently that the programmers themselves are unaware of their existence.

What is more, different companies have very varied opinions about the way generators should be used.

John Piggott, a director of SPC Systems in Wimbledon, rang to tell us of his views and his experience of the subject.

"Our company uses a Cobol generator which is installed at many sites throughout the UK," he said. "It is similar to Cobra in theory, but the emphasis is different."

The emphasis Piggott speaks of is on the language itself rather than the generator. Purity of the Cobol language is something Piggott is eager to maintain, and he referred to the practice of individuals developing their own extensions where they found Cobol unsatisfactory as a "very dangerous activity".

The difficulty starts when one asks: Whose work does the generator replace? Given that it is the programmer's, this means that when it becomes time to change and maintain the program, he has to deal with something he had no hand in writing. "What is the code?" asks Piggott. "Is it Cobol or not? The new element in Cobol which is introduced by all these individual sites makes it a completely different language, so people everywhere have their own personalised language. This just makes things utterly confusing."

The immediate reaction is, of course, to say, "Well, if Cobol was a better language these things wouldn't be necessary." So why do people need to write and apply all these extensions and macros?

"Because Cobol is out of date," says Piggott, "there is a

tendency for people to use packages and utilities which introduce these new languages."

Piggott's answer to the problem therefore lies not in developing generators but in improving Cobol. This is easier said than done, and there are inevitably many obstacles in the way of those who try to do so.

"Codasyl make standard change but at a very slow rate. It can take up to ten years to make changes to Cobol."

Therefore, to formulate a new standard and features the people require takes not only a great deal of careful planning but a long time.

Piggott's main aim is to fix and implement changes to Cobol which will cater for the needs of many different installations at the same time.

"The report-writer option in Cobol is already there in standard, but is one of those features which many people don't implement."

"IBM officially provides a feature, which SPC implemented on ICL 1900 and 2800 machines. Four years ago a committee brought out a report on validation in Cobol, which was resurrected last year, and a new report was brought out which now provides a specification for validation."

The Cobol validation feature is a "natural extension to Cobol" which provides input validation, updating and error reporting.

"We feel that the idea is to improve Cobol itself and not to have programmers who use it," says Piggott, "eventually forming a standard language which everybody without the need for these personal extensions."

More or less the same happened with the Cobol validation feature, which SPC implemented on ICL 1900 and 2800 machines. Four years ago a committee brought out a report on validation in Cobol, which was resurrected last year, and a new report was brought out which now provides a specification for validation."

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## Struggling and juggling

A FEATURE on this page some months ago about the company F International revealed to some extent the role and responsibilities that professional women can have in the world of computers (Page Six, November 8, 1978).

Women in the US, however, seem to be finding things more difficult, according to a recent Women in Data Processing meeting in New York.

One speaker at the conference, a senior manager for Price Waterhouse, said, "Women struggle and juggle their lives and careers not only in subtle but obvious ways. They also contend with mental guilt and pressures from other people."

These pressures seem to be the result of "juggling" priorities: "one day a sick child, the next a business trip."

Strangely enough, the employees of F International and indeed other women in industry we have spoken to view these conflicts quite differently.

They seem to consider a mixture of work and domestic responsibilities as satisfying.

We would like to hear more from women in the computer business, particularly those who are also involved in raising a family, to see if, as the New York conference suggested, some people have to be "superwomen."

THIS week's problem is what you might call a "disappearing arrow". The seven pieces are arranged to form a square. See page 59 for solution.

by Judith Morris

## SOFTWARE FILE

## Altergo database will hit IBM's DL/I

THE launch of Altergo's database Aros is timed to coincide with some unfavourable opinions about IBM's own DL/I-DOS-CICS database management system recently published in the US computer Press and, not so auspiciously, with Insac's takeover of the ailing US subsidiary Altergo Software Inc (CW, March 6).

Altergo's managing director, Dave Brownlee, is expecting it to add about £3 million a year to the gross sales value of Altergo's software products and increase current sales by 50%.

The company hopes that Aros will find favour as a communications software alternative to IBM users across the 4300 range to the 303X. It can be used with CICS/VS or, should a user choose to be dependent on Altergo rather than IBM software, with Altergo's flagship, Shadow II, which already has over 400 users.

Altergo selected Aros after a search for a product to provide a database/data communications environment which would

answer the demand for online real time processing.

Its Swedish developer, Rosam Adb, has already spent 10 years working on Aros, in conjunction with Asea, the Swedish manufacturing company which now runs the system with an 8-megabyte 3033 under OS/MVS, with 1,300 terminals accessing a database spread across 50 3350 disc drives.

Apart from reduced overheads in memory and CPU utilisation compared with IBM's DOS/VS DL/I and the space-hungry IMS, Aros is said to cut the disc I/O overhead by half. Physical I/O, says Altergo, is faster than any IBM access method, and the elimination of pointers and chaining techniques results in fast response times.

If the product lives up to the claims made for it, it might find a ready market in the US. A recent Computerworld survey reported that of 25 4331 users, only five intended to use the DL/I-DOS-CICS database, and according to complaints from users who had

tried it, it was not flexible enough, lacked sophistication and in one case failed to interact properly with CICS or VSE/VSAM.

US users are switching to other vendors, and a recently released package from Consolidated Business Systems called DAI is also aimed at providing an alternative to DL/I.

But Altergo claims that Aros, with its competitive size, speed and security features, is the "first full function database management system specifically designed for the IBM teleprocessing/online environment," and seems confident that it will find a ready market.

Aros runs under DOS/VS, DOS/VSE, OS/VS1 and MVS in four different versions, and prices for a one-time licence vary from £15,000 to £45,000.

## VME/K version of Q-Pay being developed

Q-PAC Services of Maidenhead took advantage of Computermarket in Birmingham last week to announce the availability of its Q-Pay payroll, personnel and labour costing system to run under ICL's 2900 VME/B operating system.

## Going for Datapro hat-trick

FOLLOWING the success of Logout and Boost in the Datapro honour roll (Software File, February 7), Macro 4 is putting its latest product, Dumpmaster, on general release after extensive and productive field tests.

It can be used in IBM DOS/VS and DOS/VSE environments and provides a "mini-dump" which extracts the relevant information needed by an applications programmer to trace bugs and identify failures.

Diagnostic information is produced in a condensed report in which some of the interpretation is anticipated, thus saving much programmer time otherwise spent ploughing through superfluous pages of dump. Dumpmaster is also claimed to reduce paper wastage.

Macro 4 adapted the product for DL/I users after recommendations from test sites, including British Caledonian. David McQueen, manager of Technical Support at British Caledonian, commented that it had been of particular value in Assembler programming.

The programs are written in Cobol under IBM DOS, and converters have been developed to produce versions for other manufacturers' hardware. VME/K is under development for ICL users, as are Honeywell Level 66 and Level 64, and the suite is already running on Burroughs B6800 and Hewlett-Packard HP 3000 hardware.

The package is a complete system with no optional modules, and takes up about 30K-words on an ICL 1900 and about 65K-bytes on an IBM or other byte machine. The customer enters his own parameters to match the system to his own requirements and can continue to use his existing input documents. Setting up takes between two and eight weeks.

The cost is £5,000 for a 500-employee system, which gives the user a five-year licence, with full updates. There is an additional £500 a year maintenance charge, and after five years, contracts are renegotiated at 70% of the then going rate for the package.

About 130 companies run the system, and it is running as a pilot system at two VME/B sites. VME/K is likely to be ready in about six months' time.

Q-Pac Services does not have its own computer, preferring to buy time at various sites, notably Dataklak and Racal, both of which are also based in Berkshire.

## Post Office commissions SPL for portable Chill front end

THE Post Office has commissioned SPL's International research centre in Abingdon to produce a portable front end for its Chill compilers.

Chill is the language developed by the International Telegraph and Telephone Consultative Committee, which sees on the concepts of languages like Algol 68, PL/I, and Pascal. It is intended to have a

broad application and will be adopted as the standard language for System X.

SPL is already involved in designing, testing and evaluating the US Department of Defense language, Ada, as well as research on a real time variant of Pascal, a commercial Basic, and RTL/2 on a wide range of mainframes, minis and micros.

## International directory

FIRST edition of the International Directory of Software, companion to the Computer Users' Year Book, is now available (Software Supplement, February 14).

Its main purpose is to enable readers to locate software products suitable to their needs and compatible to their equipment, and it provides over 1,000 pages of information on important software products throughout the world.

The information is divided into six sections with the aim of helping the user to make a rapid selection and comparison of products. The first of these is a comprehensive index of contents in English, French and German, and the other five sections are all preceded by instructions on how to use them in three languages.

The newest section provides detailed software product descriptions in a uniform format, dividing them into categories such as development aids, compilers and utilities.

The other sections give further details, comprising an index of products by category with hardware requirements, an index of industry specific products, profiles of software suppliers, and an alphabetical list of products.

## Covering gap in products

A PAYROLL and personnel inquiry system originally designed for Banque Nationale de Paris is now being marketed in the UK by its developers, the Burroughs specialist software house Watsons Computer Systems of Liverpool for about £8,000.

Watsons believes that the product covers an area not catered for by Burroughs' own software, and hopes to find a market for the system among banks and large institutions using Burroughs 90 and upward hardware.

The payroll and records integrated system, known as Paris, stands alone as a set of five modules written in Cobol, centred around a basic unit. Using simple screen menus and categories specified by the user, relatively unskilled staff can select information by entering up to 20 parameters.

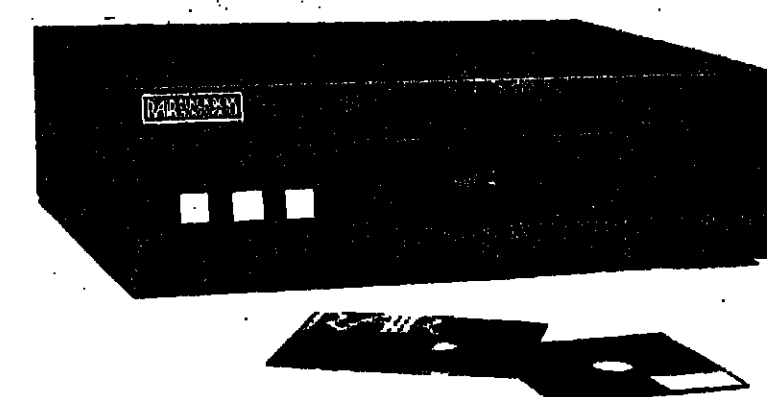
## Harris gets Fortran validation

HARRIS Computer Systems has achieved US government validation for Fortran 77.

Supported under the Vulcan operating system, the Fortran 77 compiler is now available in the UK with the Harris 100, 500 and recently announced 800 series.

Fortran 77 is the ninth language to be made available under Vulcan, which also supports T-ask, Total and Shades, the screen-handling and data-entry system.

## The microcomputer that thinks it's a mainframe



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## THE ALPHA MICRO COMPUTER





## PEOPLE and EVENTS

### Centronics expands European operation

IN a move to expand its European marketing operation, Centronics Data Computer has announced two new appointments.

Gordon Ambidge becomes director of sales and marketing with Centronics and will be responsible for the company's printer market in Europe. He was previously international marketing manager for Perkin-Elmer Data Systems, and has spent 15 years in the computer industry including periods with Burroughs, Data 100 and Data-saab.

Newly-appointed European product marketing manager for Centronics is Ian Hillier-Brook, who previously spent seven years with Digital Equipment.

George Kendall, who has been with Prime Computer's government branch since 1976, has been appointed the first branch manager of the division after the upgrade of government branch to district status. David Howes has become branch manager in government district. He was formerly senior sales executive with Prime's Hounslow office.

Peter Allen has joined MSS Computer and Business Consultancy as marketing consultant specialising in the education and training areas. Harry Parker has also become a marketing consultant in accounting applications and David Pyke takes over insurance and banking applications.

Peter Jowett has been appointed to take charge of the West Midlands Gas computer services. He has been controller of computer services (designate) for the past five months and was previously the region's 2900 computer manager.

### IBM chief to retire

CHIEF executive officer of IBM Frank Cary has announced his plans to retire after his 80th birthday in December. He has headed IBM since 1973. Cary, whose retirement was anticipated as most IBM executives retire at 80, would not say if he intended to remain chairman of the company and said it was premature to talk of plans for his succession.

Bob Doe has become service manager for Rapid Recall. He joined the company in 1976 as an internal sales engineer and after leaving to join AMO, rejoined Rapid Recall last year in the applications department.

Mike Régent, until recently a southern area sales manager for Intel, has become sales director with Rapid Recall.

Brian Carre has joined Memorex UK as administrative manager. He was previously with Olivetti.

Roger Barrett and Martin Peel have both been appointed area managers for Powerline Electronics. Both were previously with Coutant Electronics.

Lloyd Collins, a member of Computer Weekly's display advertising sales team for nearly three years, is leaving to join Rair Terminals as a sales engineer.

### DIARY

Pet — the microcomputer for business, industry, education and the home. IETE, The Sussex County Cricket Club, Hove. 18.30.

Cobol and Micros. BCS Cobol specialist group. 13 Mansfield Street, London. 14.15.

The future of MT in Europe. Prof Y. Wilks. BCS Natural Language Translation Specialist group. King's College, London. 18.00.

Getting the best out of your system — Introduction to capacity management. IDPM Central London branch. Pearl and Dean Studios, Broadwick Street, London W1. 18.00.

MARCH 17  
Voice response — the techniques and its application. BCS Cheltenham and Gloucestershire branch. Queens Hotel, Chelmsford. 19.30.

MARCH 18  
The complexity of problems and the Human Window. British Chapter of the ACM. BCS HQ. 13 Mansfield Street, London WC1. 18.30. Tel: 01-950 4811 ext 828.

A language for interactive teaching. BCS Birmingham branch. Gilbert Rapp Building, Birmingham University, Birmingham. 18.30.

MARCH 19  
A practical solution of an LP problem involving semi-continuous and dual integer variables with a non-linear objective. BCS mathematical programming study group. London School of Economics, London. 18.30.

ANSI 74 Cobol on microcomputers. BCS Cobol group. BCS HQ. 13 Mansfield Street, London W1. 14.15.

Workshop — project control. BCS Belfast branch. NCC offices, Belfast. 10.00.

MARCH 19-20  
IBM CUA Local Authorities group. County Hall, Piccadilly Gardens, Manchester. Tel: 01-531 1643.

MARCH 27-28  
The changing balance of man/technology. Institute of Administrative Management. Bourne-mouth. Details: 01-458 0171.

MARCH 31  
AGM of BCS Forthran specialist group. BCS HQ. 13 Mansfield Street, London W1. 10.30. Tel: 0333 554455 ext 165.



Ambidge

Courtot

Meadowcroft

Lawn

Booth

Perkins

### Racal director appointed

Philippe Courtot has become international sales manager of Modular Computer Services. He joined Modcomp in 1974 as founder of the French operation and his most recent appointment was European sales manager with the company.

Doug Staples and Roy Horton have joined Case as territory managers for the north and south respectively. Staples was formerly with Racal-Milgo and Horton joins the company from Interscan Communication Systems.

Neale Wade has become regional sales manager for Geest Minicomputer Systems. He was formerly a regional sales manager with Texas Instruments.

Peter Weinreb has become vice-president of European operations for MSI Data International with responsibility for all MSI activities in Europe. He was previously director of European operations.

Frances Lawn has become product manager with ITT Business Systems. She used to be head of software section with the company.

David Booth has been appointed a director of Wiggins Teape Idem division. He was previously regional marketing manager for the UK and overseas with the firm.

Judy Perkins has been appointed manager of the Pelco Alm Service Centre to set up a service contract arrangement for users of the Rockwell Alm 65 microcomputer.

Phil Parkin has joined Computer Time Sharing Services as marketing manager. He was previously sales executive with MDS Data Processing.

### Entrepreneurs meet the PM

SEVERAL representatives of the computer industry were present at a reception held by Downing Street last week. The Prime Minister had some of Britain's most successful entrepreneurs to reception after a visit to the Department of Industry, which she had discussed the country's economic situation such people are making the economy.

Guests included Emmanuel Perle, chairman of Racal Electronics, Steve Shirley, director of F International, Neil Hughes, chairman of Hughes and Collin Southgate, chairman of Software Sciences.

Daniel van der Plas, chairman of Europool, is the director of CIG, Europool, formed by an association of computer service bureaux from European countries.

Howard Osborne has been communications development manager with Arbat (UK) which was formerly with Tymtech a consultant.



Sales director of Plessey Semiconductors, Ken Bradshaw, welcomes the Queen to Plessey's Silicon Chip stand, which is one of the attractions at the Ideal Home Exhibition at Earls Court, London. The Queen and Prince Philip spent some time inspecting the stand which demonstrates the methods of manufacture and applications of the silicon chip.

## Union chief calls for technology ministry

TO combat what he sees as the falling ability of the Department of Industry to cope with advances in science and technology in this country, ASTMS president Douglas Hoyle has called for the creation of a new Ministry of Technology. Up to 1970 there was such a Ministry, but after various changes of government its functions are now handled by the DoI.

Hoyle says that a totally separate department is needed devoted to developments in microelectronics and computers in general, communications technology such as fibre optics and even in scientific research on genetic engineering.

"At the moment government activity is piecemeal," Hoyle told Computer Weekly. "It has, for example, dramatically cut back spending on training and retraining, but these areas are absolutely necessary for the future. A Ministry of Technology would have to develop a theme which the government and industry could follow."

A DoI spokesman said present departments and procedures for developing technology were sufficient.

Over two years ago (CW, December 15/22, 1977) there was an unsuccessful call by some members of the Society of Civil and Public Servants for a Ministry of Computing.

### Hard copy from colour displays

HIGH quality hard copy from raster scan colour graphics displays can be generated by the Model 31 colour graphics system announced by Calcomp. The Model 31 can produce 35mm slides or 8 x 10 inch prints.

The Model 31 was developed in the US by the California firm Dunn Instruments with the Polaroid Corp. Calcomp has the exclusive marketing rights to the system outside the US.

Prices for the Model 31 in the UK start at £7,500.

### Jaime in UK Junior Chess Squad

JAIME GORMAN, Computer Weekly's 12-year-old chess-playing protégé, has been selected for the British Junior Squad, a group of 44 players up to the age of 18 from which national teams are picked. Jaime was selected because of his improved performance over the last year, which included a placing in the Evening Standard national junior championship. Jaime played for Kent in the under-14 All-England Championship last weekend. His sister, 15-year-old Sophie, has been bitten by the chess bug since being taught to play by Jaime. Last week she helped the Kent under-18 team to victory over Surrey.

## NEWS IN BRIEF

### Canadian link for IPSS

IPSS, the Post Office's international packet switched service, has been linked to Datapac in Canada and plans are being implemented to link it to two more Canadian networks Globdat and Infoswitch.

IPSS will be linked to the Canadian networks using a modified form of the X25 protocol at first, although it is eventually planned to use the X75 protocol which is being developed for inter-network links. The new service is offered by the Post Office in conjunction with Teleglobe, Canada's international common carrier which also owns the Globdat network.

### Prestel Int. opens

PRESTEL International officially opened last week after trials that began last summer (CW, August 30, 1979), but terminal equipment is still waiting for approval from the Bundespost before it can be attached to the West German telephone network.

A spokesman for the Bundespost said there was no reason why approval should not be granted.

### Arabian access

SAUDI ARABIA has gained dial-up access to Mark III, the international teleprocessing network operated by General Electric Information Services Company from the US. Subject to the approval of the Saudi government, subsidiaries of foreign multi-national organisations with offices in Riyadh are offered access to the network via 400 bps links to a local hub.

## CAL inquiry service set up

AN inquiry service on computer-aided and computer-managed learning has been set up at Imperial College, London, to help teachers at all levels in the education system. The Council for Educational Technology has funded for two years the appointment of an information officer who will answer inquiries and gather information on all sorts of applications of computers in education and training.

The service is based on Imperial College's CEDAR Project (Computers in Education as a Resource) which maintains a library of books and reports on the subject, and has an online catalogue of these publications with available CAL packages. The catalogue is published on microfiche.

The newly-appointed information officer is Judith Morris. Inquiries should be directed to 01-580 5111 ext 1160 or 1197.

### Adam and Tina go nationwide

ADAM and Tina, the operator-programmable systems produced by the Logical Machine Corp., are to be available around the country in a number of new business centres being opened by Beam.

The company already has centres in Manchester and Cheltenham, and more are planned for later this year. In addition to the Lomac systems, the centres will also sell equipment from National Panasonic, Trivector and Philips, with other office equipment such as furniture.

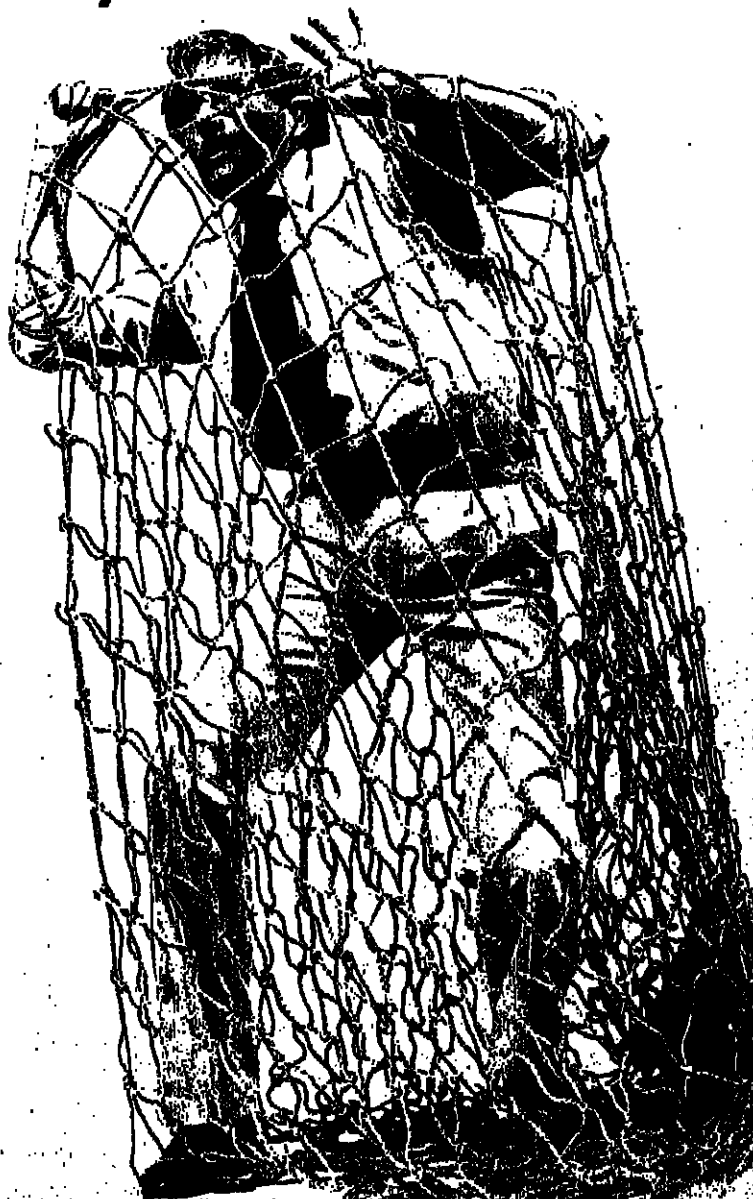
Beam is the office equipment division of UAC International Group, which is part of Unilever.

### Teletext broadcasts

THE Australian government has decided to allow teletext broadcasts, and some will begin soon. Local manufacturers are expected to produce plug-in adapters and suitable modified televisions within three to six months. Other systems and developments, including interactive services, may be given field trials by the Postal and Telecommunications Department and industry.

## Looking at large interactive systems DECsystem-10 or -20.

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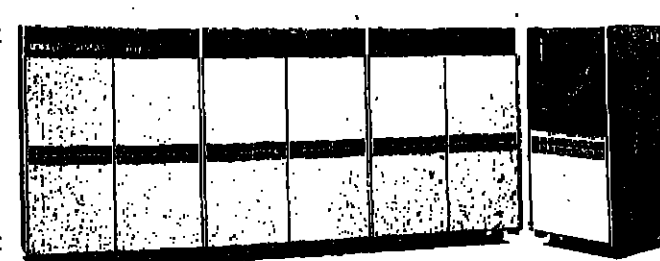
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CHRIS YUETT EXAMINES THE NEW IDPM SYLLABUS

## Accent on practical side of DP

DO you know the pros and cons of using an overhead projector for explaining a new system to a bunch of confused users? Can you advise on drawing up shifts for the ops room or drafting recruitment advertisements for Computer Weekly?

This is the type of topic that the Institute of Data Processing Management covers in its new examination syllabus to emphasise its belief in itself as the practical institution for the computer professional.

Formed following the amalgamation of the Institute of Data Processing and the Data Processing Management Association in 1978 (CW, April 8, 1978), the institute sees itself as bringing together the managerial orientation of the DPMA and the educational and professional orientation of the IDP.

It has set itself a target of 10,000 new members and, to help with this, the institute has produced a loose-leaf booklet for prospective members and students which also includes an application form and a reply-paid envelope.

The booklet sets out the principal objectives of the institute, which are to advance the interests of the DP professional and its members, to set standards for the professional and to confer recognition upon those practitioners who meet the standards.

It has already become a pressure group from government level downwards for the industry and its members. It is pushing its views hard at the variety of seminars and conferences which are springing up all over the country.

The institute publishes occasional reports and participates in the work of private and public committees, study groups and investigations.

There are five grades of membership: full Member, which requires a minimum of eight years' experience and one year's associate membership; Associate, which requires a minimum of four years' experience; Licentiate, which is awarded to applicants with under four years' experience and with certain approved professional qualifications; Individual Affiliate, which is available to any computer user and others who wish to support the institute; and Corporate Affiliate, which is available to any corporate body, such as local authorities and firms.

Students registered for the institute's exams need not be members but, if they wish to join, may qualify for an affiliate or professional grade, according to experience.

The exam is set in four parts: Higher National Certificate level. An HNC is accepted as equal to a degree by many employers, and usually covers the first two years of a degree course.

The minimum level of entry is four GCE O-Levels or their equivalent or an equivalent level of ability. So there is little reason why even a trainee operator or punch girl should not apply.

Many of the senior members of the institute emphasise that the word "management" in its title is misleading, as most people in the industry have some management responsibility and

may even be in charge of more people or equipment than many traditional managers are.

Exemptions are available for holders of GCE A-Levels, ONDs, ONCs, degrees, the National Computing Centre's Basic Award in Systems Analysis and Part 1 of the British Computer Society examination. Most people I have talked to in the institute do not see the BCS



CLUFF: "Exciting time to join..."

as a rival, but as a complementary organisation with a slightly different job to do.

The syllabus sets out to test the candidate's knowledge of both technical and administrative subjects and Part I comprises principles of accounts, computer technology and office equipment; Part II comprises basic statistics, data processing techniques and business communications; Part III comprises systems analysis, programming methods and techniques, scheduling and timing and control of systems development; and Part IV comprises system design management and data processing.

sing management standards.

While the institute is currently an employment agency, does take an interest in the development opportunities for its members.

To further this, the institute has had contacts with recruitment agencies to set up an employment service. It is into this via head office.

There is a view in the institute that the IDPM should develop a code of conduct for the "shoppers" and exclude agency that fails to come to the mark as well as those who break the code.

Secretary general Ted said: "This is an exciting time to join and a lot of things happen during the new years."

Now that most of the problems have been resolved, the provinces have been reorganised to form new branches.

In the Midlands, however, co-ordinating committee set up under the chairmanship of consultant Jim Ross aims at establishing a new branch in the region.

Ross, who is also a Chief Officer with the Royal Air Force Reserve, quickly mobilised volunteers into a fighting force that would take the institute to the members.

His view of devolving to the branches has wider support among the committee who are keen not to see the institute go the way of others in the UK or become London club. Ross is also keen to see people from all walks of industry join.

The two biggest problems facing the embryo branches are finding venues with a car and fitting speakers in, it is a hard work.

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## Package approach from NSC

NORTHERN Software Consultants of Manchester has entered the hardware business with a system built around the Cromemco 280-based processor. It comes with Beehive terminal, Centronics printer and two Cromemco floppy disc units, and NSC chose Computermarket in Birmingham at which to launch it.

Purpose of the machine is to get more mileage out of NSC's accounting software; users will get a basic system including purchase, sales and nominal ledger packages for about £10,000. Word processing software is also available.

NSC offers a maintenance contract on the hardware, and sees benefits in being able to provide a complete pre-tested hardware-software system which can be guaranteed operational. It also expects the class of user at which it is aimed to be prepared to put up with the occasional inconsistency in output and to alter it by hand, since such things are likely to occur only infrequently. Large users with major runs are much more likely to want comprehensive support, NSC believes. It also sees a packaged approach as the only means of serving the bottom end of the market cost-effectively.

NSC has appeared at exhibitions for several years, and reported that there had been a big increase in the number of inquiries now that it was showing a hardware product. As well as launching the Mael 5100, Computer Ancillaries gave the attractive, self-contained Durango F85 desk-top system another airing at Computermarket. Seen here in the capable hands of Michel Fasella, sales director of Durango's French distributor Machines Business Systems, the F85 is driven by the Intel 8085 microprocessor and is priced at £8,250 for the configuration shown, which comprises 84K bytes of main memory, two 500K-byte floppy disc units, 165 chips printer and full screen.

### ...AND AN EXOTIC TOUCH

## Indian firm seeks UK distributors

AN Indian company, Advanced Data Systems of Hyderabad took space at the Industrial India trade fair in Birmingham last week to seek UK distributors for its power supplies and digital instruments and to look for UK partners to take it into the microcomputer business.

"We are looking for a partner who can provide us with the technical know-how for the manufacture of microprocessor systems for industrial and commercial applications," the company's representative, V. Prasad told Computer Weekly.

"We are looking for a product in the £100 to £1,000 price range which we could manufacture at low cost in India for a partner, and envisage selling some in the Indian market and signing a buy-back agreement with the partner for the rest."

To give an example, we can do power supplies to the same quality as Hewlett-Packard for half the price, and there is Indian industrial and commercial power supplies for computer manufacturers, including ECIL in Hyderabad which manufactures the Indian TDC-316 minicomputer.

## Selling software at an exhibition

CAN you sell software at an exhibition? Three companies which have found exhibition stands beneficial are Peterborough Data, Q-Pac Services and Northern Software Consultants, NSC. All took space at the small but busy Computermarket in Birmingham last week, and all were broadly satisfied with the results, although NSC was exhibiting hardware for the first time.

"We haven't been rushed off our feet with inquiries," said Peterborough Data's Joe Franks, "but we are regulars at Computermarket, and regard it as an effective way of showing the flag. We tend to meet our existing customers, and other visitors, although showing only a passing interest to start with, often turn into useful prospects."

Formed 17 years ago, and still a private company under unchanged ownership, Peterborough Data Processing Services claims to be number one in Western Europe in the personnel administration field. As a

private company, it is not obliged to reveal turnover and profit figures, but does annual business in excess of £2 million, employs 130 people, over 100 of them DP professionals taken on after a minimum of three years' experience, and has over 400 customers for its systems, several of them bureaux serving many users.

It is big enough to have its own ICL 204 and IBM 370/115, the latter to be replaced with a 4331 in June. It also has an IBM Office System 8 word processor for preparing documentation. Its three principal products are Unipay, Unipension and Unipersonnel, described respectively as the payroll, pension and personnel "problem solver."

The software is written in IBM assembler or ICL Plan, but there are new versions for ICL VME/B and VME/K users written in Cobol; the VME/B version is in use, and the VME/K version is under test. Univac and Data General versions are also available and Honeywell versions are being developed.

Peterborough Data declines to talk prices, but aims to provide a complete service, including installing a turnkey system if required. It also provides training and aims to keep customers up to date on fiscal and pension legislation.

About 20 bureaux use the Unipay payroll service, but it is being dropped by the Post Office's National Data Processing Service on the grounds that too many others offer it (CW, January 31).

The Post Office's alternative is to offer a payroll system on a Casu Super C microcomputer, and Peterborough Data is considering its approach for the small computer market.

"We have gone down into minicomputers, but a microcomputer system would be difficult to cost-justify, because we want to provide all our users with a full service," said Joe Franks.

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## Punchy system launched at show

LATEST addition to Computer Ancillaries' Mael product line in the UK is the Mael 5100, launched at Computermarket in Birmingham last week.

The 5100 is a repackaged low-cost desk-top version of the Mael 5300, and since it is built around the same General Automation GA 16/220 processor, it packs a lot of punch for such a small system. Packaging is the same as for the Mael 2000, with built-in display, keyboard and two or four floppy disc drives in the desk-top unit. Printers running at 120 or 180 cps are offered with it, and the floppy discs are double-sided double-density drives from Persci, storing 2.7 megabytes per dual drive.

The basic system costs £9,700, with application software extra a suite of accounting programs would add about £5,000 to the price. CAL is also specialising in software for insurance brokers, making the Mael 5100 particularly attractive for small broking firms and partnerships.

Languages available are unusually comprehensive Com-

mercial Fortran, in which CAL writes all its software. Commercial Basic, Fortran IV, Cobol, Pascal, and an RPG II claimed to be 100% IBM-compatible.

### When and where to see it

COMPUTERMARKET left Birmingham for Manchester this week - it has its last day today (Thursday) at New Century Hall, Corporation Street. Next week it is in Glasgow at the Albany Hotel, Bothwell Street, from March 18 to 20 and it ends up at London's West Centre Hotel, Little Road, SW6, on March 25 to 27.

A competition to find the computer advertisement of the year is being held with the exhibition. The proceeds are going to the British Computer Society's Specialist Group for the Disabled. Judging will be in London on March 25.

## TR PDX - the digital communications switch for the electronic office



Today the Telephone Rentals Private Digital Exchange (TR PDX) is providing a telephone communications system, with many operational and cost advantages, for a number of "household name" UK organisations. It is an electronic, computer controlled, digital exchange with all the benefits of Stored Programme Control (SPC), Pulse Code Modulation (PCM) and Time Division Multiplexing (TDM). It is the first British built digital exchange to bring all these principles together and the first to obtain Post Office approval.

Not only is the TR PDX operating beneficially as a PABX but it will be available as a Tandem, Sub-Tandem, Main or Satellite system for private networks. But clearly the technology of the TR PDX will provide the digital switch essential to operating the integrated business communications and data systems of tomorrow's electronic office. Certainly for the remainder of this century.

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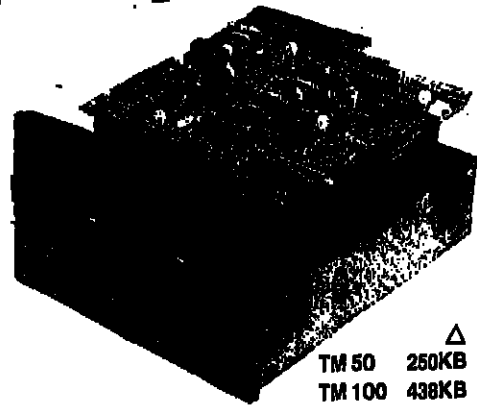
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## NICHOLAS ENTICKNAP LOOKS AT

# Marketing of fast page printer not tough enough

FAST page printers have been a feature of exhibitions and the subject of a substantial promotional and marketing effort for about two years now. With a view to seeing how far the proclaimed potential is being realised, I visited the first UK user of the Honeywell Page Printing System, EMI at Hayes, Middlesex.

Surprisingly, the message from EMI is that the product is being very much undersold — not something that the computer industry is accused of very often. According to group computer services general manager Roy Gray, "The marketing done by the manufacturers is nothing like as sharp as it should be."

A lot of comparisons are made between the cost of a page printer and a line printer, and between the relative costs of paper. But the manufacturers are looking at the equipment with blinkers on; they're ignoring the labour and overtime saving benefits, not to mention the saving on expensive engineering cover.

His colleague, Jim de Voil, operational services manager, goes further. "In the past 10 years there's not been much progress, but this system represents a revolution on the output side. People are not generally aware of the potential."

To be fair, the manufacturers have a point: trying to sell anything on the basis of its potential is notoriously difficult, if only because DP managers have to

convince their own management in terms of costs.

And EMI has a story to tell here too. In round cash, Gray estimates the net benefit as "in excess of £50,000 a year." This comes about from the saving of six people (one operator on each of three shifts and three paper-handling staff) and of two line printers, plus a variety of other smaller savings.

Savings of this kind are well worth making, but Gray feels they are insignificant in comparison with the new and more timely services it enables him to offer his users. As many of these stem from the basic design of the system, it is useful to give some details of the PPS.

The Honeywell PPS is an electrostatic matrix printer; as such it differs from other fast printers like the IBM 3800 and the Siemens ND2, which have a printing method similar to xerography but employing a laser to expose the photosensitive film. The use of electrostatic technology is cheaper, but means that the PPS requires special electrically sensitive paper.

Both types of system operate at similar speeds, which vary according to a number of factors. Because of this, IBM does not quote rated speeds. Honeywell sells three versions of the PPS; EMI has the medium-speed one, which is rated at 12,000 lpm or 140 pages a minute.

An important aspect of the PPS is its forms-handling capabilities. The system uses a

continuous roll of paper which, pulled through the system, sprocket holes are necessary.

As a result, no trimming is required, and neither is burring or decollating. The paper, to the length required by the user, is cut into multiple copies of the report and stacked in different hoppers under software control.

EMI produces its reports in size. The fact that reports produced on the system are the same size as those produced on conventional typewriters has proved important in gaining user acceptance, paving the way to new applications.

For example, EMI executives are turning more and more to the printing system for the production of board reports, sales and marketing forecasts, Accountants are using it for consolidations.

These applications permit considerable saving in system time, as well as a reduction in the time it takes to bring a report before the board. They also make for savings on the photocopying bill. It costs around 1p to produce a photo-reduction of a report, compared with 1p on the PPS.

Another new application is the production of telephone directories which, in offices, are notoriously out of date the moment they are produced. The PPS can produce absolutely up-to-date

• Turn to page 17

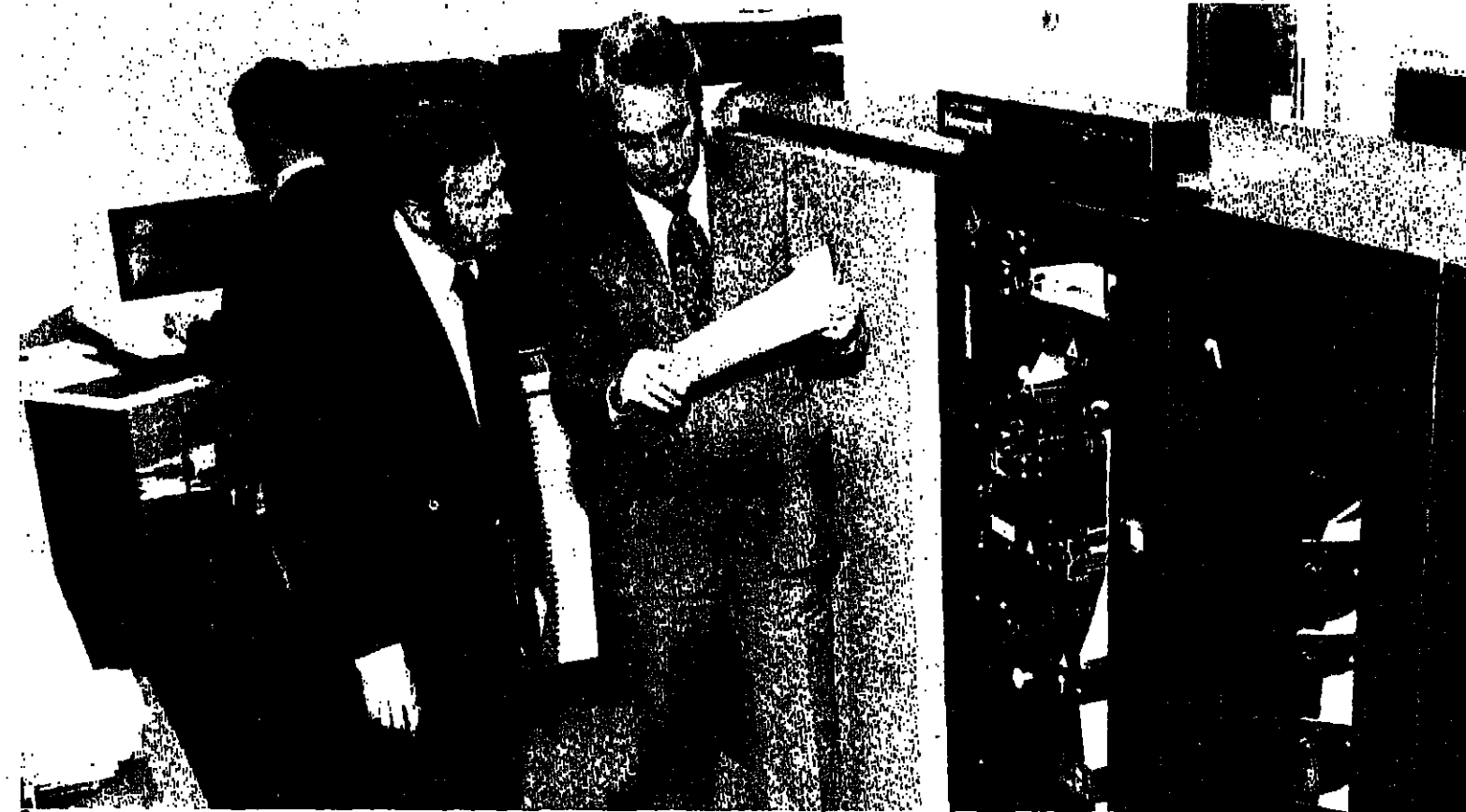
## HONEYWELL'S HIGH SPEED PPS SYSTEM IN ACTION

High speed page printers have been the star turn of many a computer exhibition over the last two years and some users have taken the plunge in installing one.

Nicholas Enticknap, as part of Computer Weekly's Systems in Action series, reports on EMI, the first UK user of Honeywell's Page Printing System (PPS).

Surprisingly, EMI said that the system was being undersold. Many manufacturers appear to be judging such systems on a straight cost comparison with line printers and the cost of paper, and ignoring the hidden benefits of cutting labour costs and maintenance.

Enticknap found that, now EMI has got the system working efficiently, it is in a position to offer time on it to customers outside the group.



A PPS feature which has proved attractive to EMI managers is the ability to produce normal A4 sized reports. Our picture shows Roy Gray (right) examining some reports with Jim de Voil.

• From page 16

copies on demand, but can also produce selective directories, covering for example all the people in one building; this leads to more savings.

Telephone directories are usually produced by internal printing departments, and Roy Gray feels that many other such tasks will eventually be taken over by the PPS.

The quality of the output, and in particular the system's ability to print lower as well as upper case, also permits the development of word processing applications.

Gray quotes as an example of the applications he would like to develop the printing of personalised payment overdue letters, which gives precise details of payments history and the amount outstanding. Another example is personalised mailing shots, which could refer, for example, to specific purchases the customer had made.

Cost savings not yet covered include an important saving on pre-printed stationery. This is not required for the PPS, as the same effect can be achieved with a forms overlay.

With conventional line printers, EMI was holding stocks worth about £100,000, so the saving here is in the region of £15,000 alone on interest charges.

Apart from the cost, it saves the worry that a supplier might let you down with a late delivery, or that you don't have sufficient stock to do a re-run. There is also a hidden saving in that, in the nature of things, a lot of pre-printed stationery tends to get thrown away because of organisational changes.

EMI installed the PPS in November 1978 when, as mentioned, it was the first of its type in the UK. A three-month development period followed, during which EMI was ensuring that the system was both reliable and maintainable, and Honeywell's engineers were getting used to the system.

It was expected that the special paper might be a source of problems, but this fear proved to be unfounded. Current experience is that one roll in a thousand is slightly suspect, which is a better average than three-part paper gives.

This is partly because the company takes all due precautions. The rolls of paper are removed from the store to the before they are due to be used, probably unnecessarily, as the conditioned, but EMI nonetheless makes a point of doing it. The main snag with the paper

is that it has to be imported from North America, as it is currently available to Honeywell's specification only from two suppliers, Crown-Zellerbach of Oregon and Nashua of Canada. Next year, however, it is expected that it will become available from a number of European suppliers.

The paper handling equipment has been similarly satisfactory; only teething troubles were experienced, due to a couple of minor technical problems which have since been eliminated.

Another potential worry was the serviceability of the PPS. To check on this, Gray made inquiries in the US, which showed that the results the pioneer American users had achieved were quite satisfactory.

Overall availability has in fact exceeded EMI's expectations. Gray says that although MTBF is a meaningful measure, the best way of estimating this is in terms of how often a fault recurs before it is finally cured.

"Initially there were many — this was because the engineers hadn't got to know the system, and therefore often failed to recognise when it was necessary to put in a replacement part. But now we go a couple of months without a fault."

This reliability was put firmly to the test in August, when for a variety of reasons the workload was exceptionally high. Just how high can be seen from the figures — EMI's original plan was to work up to a throughput of 1.25 million pages a month over a two-year period, but in August, only six months after production work started, the PPS produced two million pages.

Another indication is that, as part of a general move by EMI into the bureau business with a range of different services, the company is now marketing a PPS service to customers outside the group.

For the future, EMI's sights are set on an upgrade to the PPS 2 system, which is more advanced in several respects.

The most important of these is that instead of the non-programmable minicomputer controlling the PPS 1, it is equipped with a 8/43 mini, running under GCOS 8 Mod 400, which can be programmed by the user. This allows much more scope with the use of different typefaces on the same document.

The current system has a flat price rental of about £8,000 a month, including options and maintenance. To this must be added a metered footage charge for paper use, which starts at £1.75 per thousand feet for the first half million feet.

## HP introduces the Matrix Machine.

If you've been thinking that only a 32-bit computer can handle your matrix intensive jobs, think about this with HP's new Vector Instruction Set (VIS). The HP 1000 does matrix inversions at speeds comparable to a 32-bit mini. At less than one-third the price.

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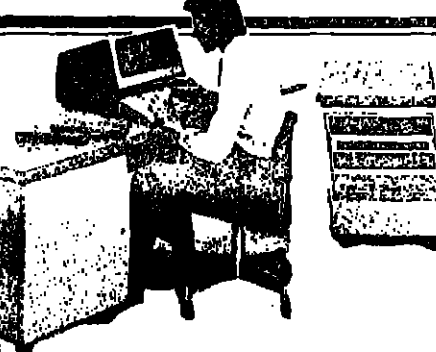
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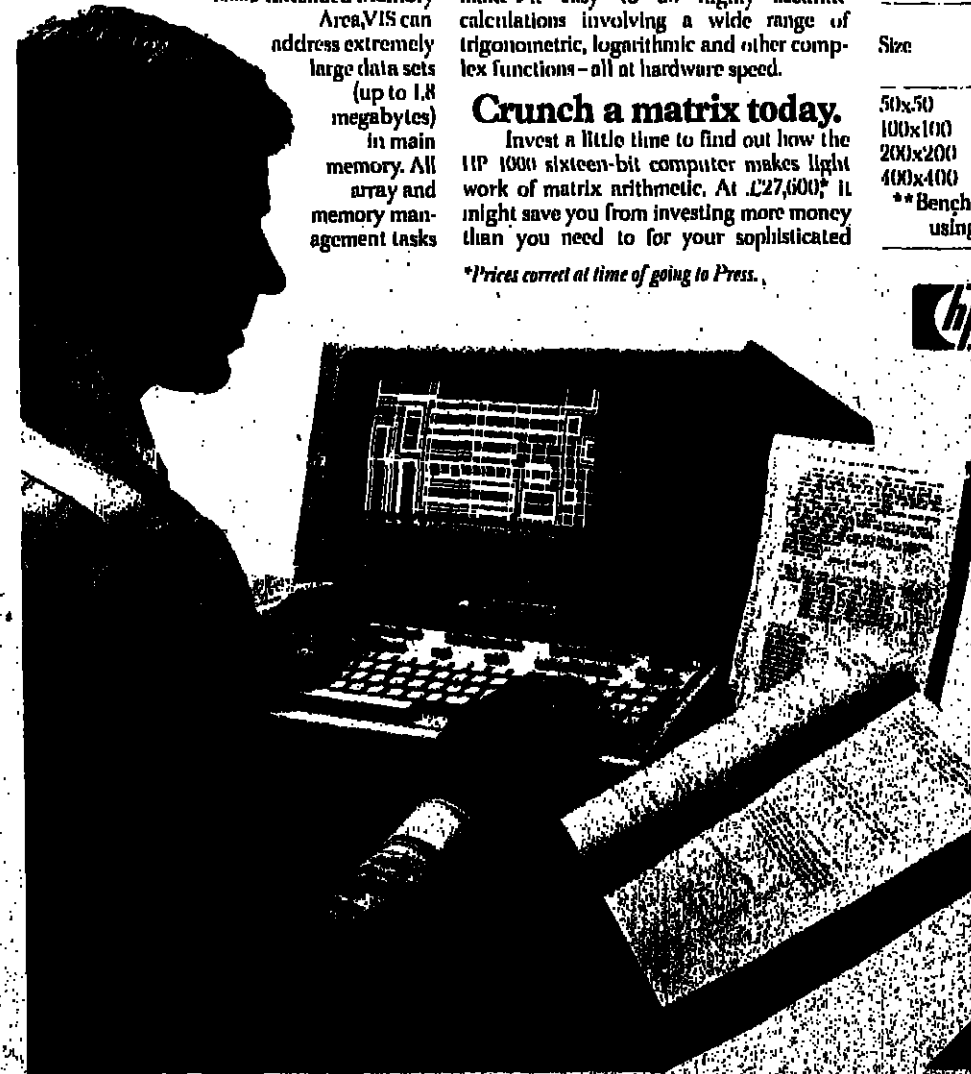
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200x200	105 sec	92 sec	
400x400	694 sec	720 sec	

\*\*Benchmark method - Matrix inversion using Gauss-Jordan Elimination.

**hp HEWLETT PACKARD**

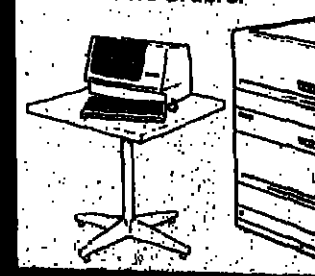


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## KEITH JONES LOOKS AT THE NORWEGIAN DP FLAGSHIP

# Ad hoc marketing plan pays off at Norsk Data

NORSK Data is the flagship of the Norwegian computer industry. With a turnover of £19 million last year and an order backlog of more than £10 million at the end of 1979 the company would be considered significant even in the UK.

In Norway Norsk Data's relative importance is almost as great as ICL's in this country.

Nevertheless Norsk Data is still small enough for the markets which it addresses to be determined by the interests and abilities of individual employees

and by opportunities as they arise.

No overall marketing strategy appears to have been drawn up yet to attack specific market areas and the most significant development seems to be the build-up of commercial type customers in Scandinavia using the Norsk Data transaction processing system, TPS, or typesetting software, Nordtext.

Moreover, Norsk Data claims that its Sibas database system is the most common system of its

kind now in use in Norway and Sweden.

In the UK the powerful interactive capabilities of Norsk Data's Nord machines, with the wide variety of languages that can be supported by the versatile Sintran III/VS operating system, are starting to win university orders.

The first major contract was placed in February by Reading University for kit that included two 18-bit Nord-100 minicomputers and one 32-bit Nord-500. The 100 and powerful 500 were

announced in 1979, and superseded all earlier Nord machines.

But Norsk Data's biggest contract by far in the UK to date was placed last year by the Joint European Torus nuclear fusion project at Culham Laboratory in Oxfordshire.

It was added to the list of rather exotic and diverse scientific and technical type applications for Norsk machines that characterised the history of Norsk Data throughout the 1970s.

In the sense of being a nuclear project, JET is loosely related to the synchrotron project at CERN, the European Organisation for Nuclear Research at Geneva, which is probably the best known application area to date for Norsk minicomputers.

From an original 24 Nord-10 minicomputers ordered about seven years ago, the line-up of Norsk Data kit at CERN has grown to a formidable 120 machines.

The chances of picking up substantial new contracts in an area as limited as nuclear research are obviously not very great, and Norsk Data also sees no great potential in aircraft simulation, an application with which it became involved through an \$8 million contract placed two years ago by the US firm Singer-Link.

Nord machines are to be used by Singer-Link to control simulators that Singer is building for the F16 fighter, but Norsk Data admits that its success against US based competitors, notably Systems Engineering Laboratories, was helped by the US government's desire to offset the cost to Europe of buying large numbers of F16s. Norway alone is buying 70.

Nevertheless, Norsk Data still had to "sell" its machines to Singer-Link's own programming staff who were not used to working with what, to them, was an obscure European computer manufacturer.

Winning the Singer-Link order gave Norsk Data a foothold in the US market, an achievement seen by the company as helping its business in Europe. There are now Norsk Data offices in Boston and in Dallas, Texas, the latter being the office handling the Singer-Link contract.

Because of Norway's geographical remoteness from one of its major foreign markets, Norsk Data's strategy is to develop its subsidiaries to develop local requirements and to negotiate with local subcontractors.

Activities at Norsk Data Oslo headquarters include development of a replacement for the Sintran III operating system. It will be called, possibly, Sintran IV and will incorporate Sintran III as a subsystem, so achieving upward compatibility.

Norsk Data hopes that one of the most important new features provided by Sintran IV will be the support of genuine distributed processing so that several Nord machines can be linked and files on all of them accessed by an application program running on any of the machines.

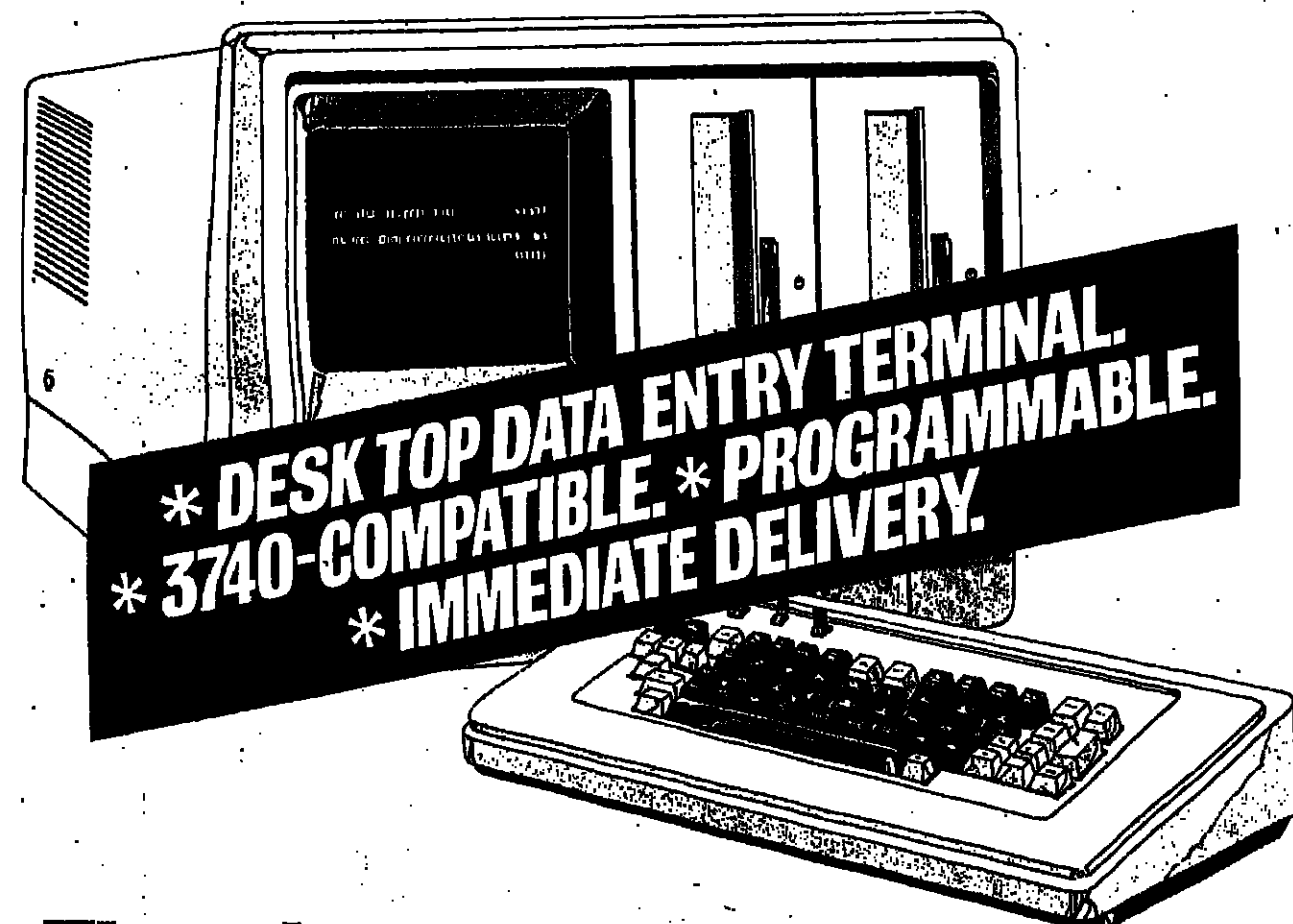
Norsk Data does not expect to announce significant changes to its hardware about another three years, although improvements made, aimed at improving the performance of Sintran.

With the 32-bit Nord-100, Norsk Data already has a machine rated at more than 1 million instructions per second. It provides up to eight megawords of main memory and comes with a cache accessible up to 64K-bytes. The Nord-100 is based on ubiquitous AMD 2800 bit-slice family and can operate either in stand-alone mode or as a front end to the 500, machines sharing the memory.

Norsk Data says that it sold 30 Nord-500s to date and that deliveries will begin this year.



Though Norsk Data sees little future in aircraft applications, it did win an \$8 million contract two years ago by the US firm Singer-Link to supply Nord machines that will control simulators for the General Dynamics F16 fighter, pictured above.



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# INDIAN SCENE ICIM emerges from the chrysalis of ICL India

ICL is "in India" no longer. In its place is a new company, International Computers Indian Manufacture, ICIM, in which ICL has a 40% stake.

Shares in ICIM are widely held by Indian investors, and are quoted on the Bombay stock exchange. In order to finance the manufacture of 2804s at Poona, the company went to the market last August to issue 1,750,000 new shares at 10 rupees apiece.

ICL subscribed 700,000 shares, at a 40% premium to keep its stake at 40%, and the issue was fully subscribed. Share issues have now raised in total nearly £1.6 million towards the cost of 2804 production.

Needing to raise further capital, the company is floating two- and three-year loans, and encouraging employee involvement by offering them a half per cent better rate of interest.

ICIM now has the precious government-issued manufacturing licences without which nothing can be done. It is licensed to build 100 2804s over five years; 100 600-card-per-minute card readers a year; 100 600-line-per-minute printers a year; and 200 magnetic tape transports.

The first six 2804s are due to be completed before the end of the financial year in September. The first machine was due to have been completed in April.

The computer room of the National Dairy Development Board, equipped with an ICL 1801A. Based in the north-western state of Gujarat, the board is now developing systems on a 2850 and a 2803, together worth £500,000. Starting off running under DME, the board plans to convert to VME/K in the future, and is developing a system to record and compare milk yields and other statistics on dairy herds throughout India (CW, June 1, 1978).



The computer room of the National Dairy Development Board, equipped with an ICL 1801A. Based in the north-western state of Gujarat, the board is now developing systems on a 2850 and a 2803, together worth £500,000. Starting off running under DME, the board plans to convert to VME/K in the future, and is developing a system to record and compare milk yields and other statistics on dairy herds throughout India (CW, June 1, 1978).

but observers believe that it is not likely to be ready before June.

Next year's plan calls for another 18 to be built, and orders for the first 12 have already been taken.

The first machine is destined for Godrej and Boyce, manufacturer of typewriters, safes and office furniture. Like most of the early customers, the company is an ICL user, with one of the 32 Indian-built 1801As.

In a country where computers are much harder to acquire than gold, it seems positively greedy for the Calcutta Electric Supply Company, CESC, to demand two 2804s; its first will be the second machine built. Other customers include Bharat Heavy Electricals in Bhopal, Binny's textiles in Madras, and the Shaw Wallace trading company, also in Madras, all of which are 1801A users.

New and first-time users include Colgate Palmolive in Bombay, DPS India in Calcutta, and a new company, Christie, Hoden Ltd, which plans to offer bureau services.

In a country as starved of and as hungry for computer power

as India, the 1801As which are returned by customers will of course not be scrapped. They will be refurbished and are likely to be offered to customers who ordered 1801As but were disappointed when manufacture ceased after the 32nd machine had been built.

The estimate is that ICIM will take back two or three a year, and that after refurbishing, there will be a further five years of life in the machines.

The machine to be built is being called the 2804/50, and the specifications look comparable to those of ICL 2804s, although memory capacity looks rather limited.

The standard configuration being offered to Indian customers includes the central processor with 48K-words of main memory and 16K-words of microcode store; a console VDU, one to four direct data entry CRT stations, 300-card-per-minute reader, 600-lpm printer, one to four EDS 60 60-megabyte disc drives and a tape unit. On the Indian market, that is a medium to large machine.

The 1801A manufacturing programme was hardly a success, since it took much longer than planned to build 32 of the 56 machines licensed. What reason is there to suppose that the 2804 programme will be any more successful?

There are, in fact, several reasons. The 1801A programme was bedevilled by problems in getting licences to import the necessary components and other items needed for manufacture, and licences were generally granted for only four or five machines at a time, after which manufacture was held up until new licences were issued. The new government is showing signs of being much more accommodating to big business, and getting imports into the country is not as difficult as it used to be: the first Wang VS computer in India arrived in February, and took two days to clear customs. Two months has often been par in the past.

Secondly, the new machines are being built at ICIM's own factory in Poona, by contrast to the 1801As, which were built in Bangalore by a government-owned company, Bharat Electronics Limited, BEL, under ICL supervision.

The third factor is that although it now has only 40% of the company, ICL in London is perceiving a much keener interest in ICIM's affairs than in the past, and is committed to the

success of the programme.

Some two years ago, ICIM picked up several orders for larger 2800s, but little has happened since then. The largest machine is a 2860, funded in part by UK government aid, at the Indian Institute of Technology in Delhi. The National Dairy Development Board, which wanted a 1804S as long ago as 1973, now has a 2850 and a 2803, while Kirloskar Oil Engines, Mafatlal textile house, and the Signal Corps of the Indian Army each have 2850s, and Bharat Heavy Electricals has two. Most promising current prospect is Life Insurance Corp of India, which is considering a 2856/10.

"ICL muddling through to a brighter future?" was the headline on Computer Weekly's first in-depth look at the Indian company (June 27, 1974), and to some extent that brighter future can be said to have arrived.

But for a company of its size, ICIM is seriously under-employed, and there are three distinct opportunities which appear to have been ignored.

There are thousands of unit record systems installed in India and ICL, all over-ripe for replacement by very small computers. Thrusting companies new to the computer business like DCM and Hindustan Computers are doing very well out of replacing these with their own mini and microcomputers.

## Report by Tim Palmer

Although a small company in world terms, International Computers Indian Manufacture, ICIM, is far from a minnow in Indian terms. In the year to September 1979 the company, 40% owned by ICL, reported pre-tax profits of £608,000 on turnover of £5,030,000. TIM PALMER looks at the prospects for ICL's successor in India.

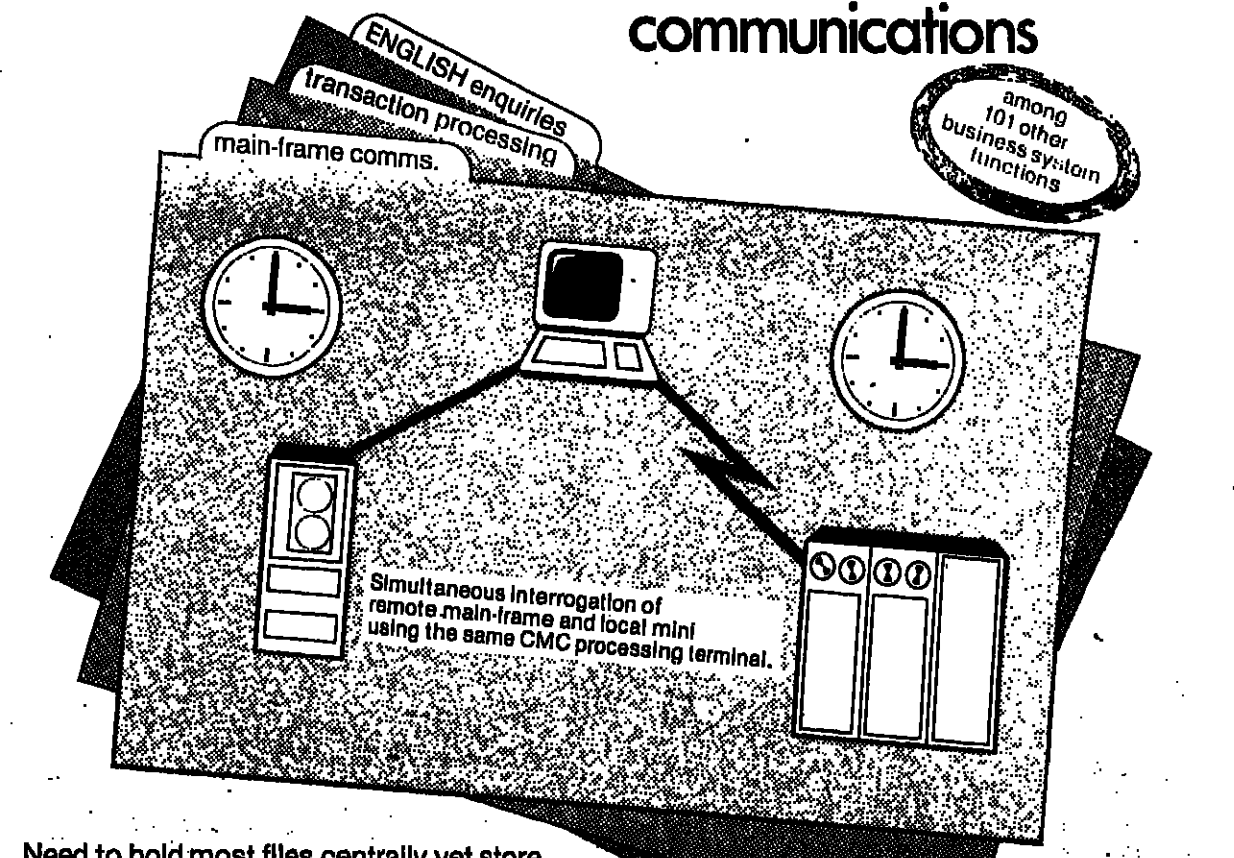


ICIM's sales force needs a product in this market to sell; it would be possible to develop one locally in about 15 months, but a ready-made product ideal for the market already exists in the ICL 1500, and the company should be hanging on the door of the Electronics Commission for permission to build a version in India.

ICL itself should be making more use of the computer resources in India by getting ICIM to do software development and conversion for use in the rest of the world. Computers may be imported into India provided the importer guarantees to export software to twice the

value of the computer. This would allow ICIM to buy a medium-scale machine or several 2803s and System Tens from ICL for use as bureau machines. The Indian computer market is dominated by services companies, and the fact that ICIM is not a major contender in this market (as IBM definitely was) loses the company introductions to potential future customers for in-house computers.

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## COMPANY NEWS

## Plessey makes up its lost ground

IT looks as if Plessey has turned the corner at last, and — now that Racal is preoccupied with turning Decca around — Plessey could once again be regarded as an electronics high-flyer.

Third quarter figures reported last week show that Plessey has made up the ground lost through strikes in its first half, and finance director Peter Marshall is looking for profits for the full year better than analysts' average forecast of £80 million.

Pre-tax profit in the October to December quarter stormed ahead 63% to £16,026 million on turnover up 19% to £191.5 million compared with the same period in 1978. The first half was so strike-hit that the excellent third quarter performance moved profits for the nine months ahead only 7.6% to £35.4 million.

Operating profit for the nine months was £10 million, which is a 31% improvement over the

1978 period, and Plessey says that stronger sales and better margins all contributed.

Two significant disposals, one beneficial and one detrimental, took place last year: in January last year, Plessey sold its one-quarter stake in ICL, so cutting itself off from a pre-tax profit contribution of some £10 million. Later in the year it disposed of its loss-making Garrard record changer business, effectively taking it out of the consumer electrical and electronic businesses.

During the nine months to December, electrical systems and equipment represented 29% of sales, followed by 22.5% for main telephone exchange and transmission equipment, 16% for office data and control systems, 15.9% for components, and 15% for the hydraulics, aerospace and engineering division. The remaining 1.2% comes from the now divested Garrard business.

## Decca losses a worry for Racal planners

HIGHER than expected losses at Decca for the year to the end of this month are cause for concern at Racal.

While the company's takeover of Decca has been agreed, shareholders in Decca have about four weeks to decide whether to take Racal shares or the cash alternative. The shares are a better bet than cash so long as Racal shares stay significantly above the 200 pence mark, but the forecast that Decca losses would be nearer £10 million than the previously anticipated £8 million caused a dip in the Racal share price, and any more bad news could leave the company with an avalanche of Decca holders opting for cash rather than paper.

This in turn would deplete Racal's reserves just when it needs to invest in bringing Decca back to profitability.

## Kode says 1979 strike hit profits

KODE International, parent company of data entry systems supplier Kode Ltd, estimates that its pre-tax profit for 1979 would have been about £200,000 higher if its manufacturing operations had not been affected by last year's engineering strike. Profits were also hit by a stock write-off. The pre-tax profit figure for 1979 was £1.25 million, no higher than in 1978 while turnover increased 13% to £8.5 million.

As in 1978, half the group's total turnover was accounted for by Kode Ltd and Kode Services, the latter being the maintenance operation for Kode equipment. The two firms form the capital goods division of Kode International.

The main product sold by Kode Ltd these days is the XL/40 multi-terminal key-to-disc system built in the US by Pertec. The Datavet single station data entry display terminal, designed by Kode itself, is no longer being built in volume, while a lot of punched card and paper tape equipment in Kode's inventories have been written off. It used to

represent the main side of Kode's business.

Pertec has just been taken over by Triumph-Adler of West Germany which already sells the XL/40 on the Continent. But Kode says that it has been assured by Triumph-Adler that its agreement with Pertec will not be affected in any way by the takeover.

However, the move over to XL/40 marketing and the decline of other products has reduced the need for manufacturing personnel at Kode's factory at Calne, Wiltshire, and 20 of the 320 workforce there have been made redundant. Kode does not expect to have to make any more redundancies.

A lot of the staff at Calne work for another Kode International firm, Kam Circuits, which builds PC boards. Kam is part of the components division of Kode International along with Moore Reed, of Andover, which employs about 250 people and builds military equipment.

Total dividend paid by Kode International for 1979 was 6.58p net per share.

Kode International prices are shown in the CW shares table.

## Dicoll sales centre

DICOLL Electronics announces that it is opening a sales and service centre at Chorley, Lancs, to cover the North of England, Scotland and Northern Ireland. Dicoll specialises in building microcomputer systems based on the Digital Equipment CSI-11 and has just acquired a second factory with a floor area of 12,000 square feet near its existing plant at Basingstoke, Hants.

## CW SHARES TABLE

DOW JONES INDUSTRIAL AVERAGE										Due 7/3/80	
1980			London Stock Exchange			Pence			Index: 98.89		
1980		1979		1978		1977		1976		1975	
High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
236	230	235	230	235	230	235	230	235	230	235	230
43	36	43	36	43	36	43	36	43	36	43	36
78	66	78	66	78	66	78	66	78	66	78	66
120	100	120	100	120	100	120	100	120	100	120	100
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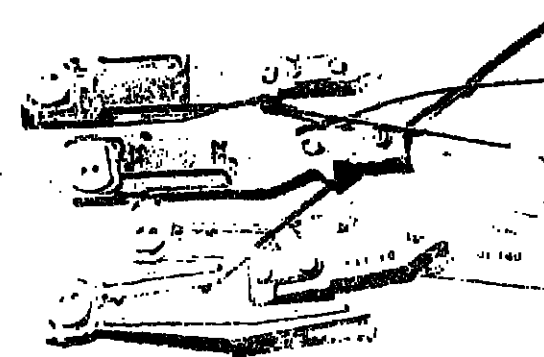
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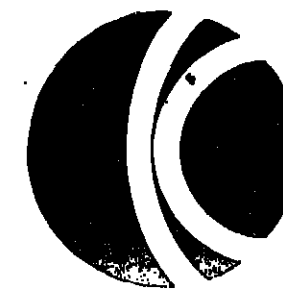
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## PRODUCT NEWS

## Mains isolating unit for minicomputers

FROM Foster Cambridge comes a temperature sensitive, mains isolating unit designed to protect small computers in the event of a significant rise in the ambient temperature caused by a failure to the air conditioning plant — and it is said to allow DP managers to sleep easier at night.

It was designed following an air conditioning unit failure at Foster Cambridge's own installation, which suggests that the isolating system could help to eliminate three-shift working and reduce downtime.

The isolating system comprises two units — a 150 mm Clearway dial indicator calibrated from 0 to 40°C and having a spiral temperature sensing element filled with mercury as well as a three-phase isolating control box.

The dial indicator is normally mounted at the position in the computer room where equilibrium exists between a heat source and the flow of cool air, while the control unit is fitted close to the main three-phase isolating switch.

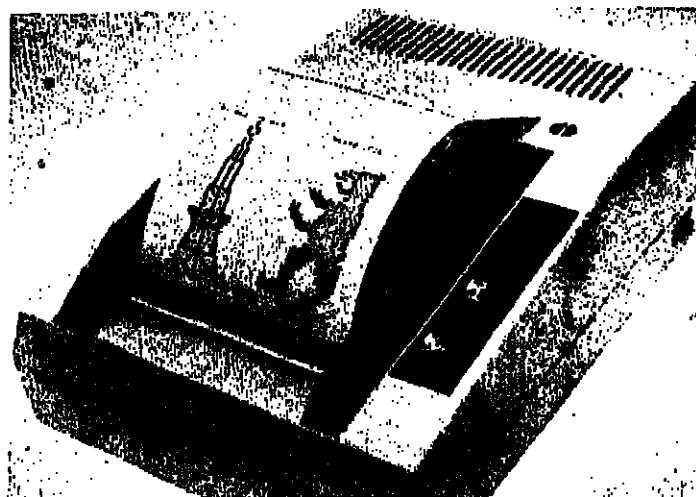
There are two set pointers on the dial indicator. One is set to the manufacturer's recommended maximum operating temperature, about 30°C, while the other is set somewhat lower at, say, 25°C.

Should the ambient temperature rise to the lower setting, this would trigger a built-in audible alarm. During normal working hours, this would be heard and allow corrective action to be taken. A push-button can be used to cancel the alarm.

If the temperature continues to rise to the higher setting either through it being an unattended period or through no action being taken, then a three-phase isolator within the control unit trips out, shutting off the supply to the computer distributor panel.

Once switched off, the mains then cannot be switched back on without human intervention in operating a key. This avoids the possibility of the whole cycle repeating itself as the environment cools and then heats again.

The unit is priced at £450. Foster Cambridge Ltd (CW), Howard Road, Eaton Socon, St Neots, PE19 3EU. Tel: 0480 75321.



NMP.40 printer for teletext services.

## Screen image printer for teletext systems

ANTICIPATING the future need for hard copy printouts from teletext services such as Prestel, Olympia has designed a screen image printer using its NMP.40 mechanism and Dataplot will be distributing them in the UK

either "ready to run" or OEM. As a universal data interface has yet to be completed, Olympia does not expect to provide full drive electronics for UK television systems until later this year.

The NMP.40 is small and said to be very quiet, and has a print station consisting of 240 discrete electrodes, equi-spaced across the 127 mm (five inch) wide paper, each being individually sprung loaded on to the paper.

The only moving part is the paper transport drive which consists of a rubber platen driven by a small DC motor. The opto pick-up gives line timing information.

Paper is loaded by lifting the platen assembly and dropping in a roll of metalised paper. In operation, a button is pressed to initiate printing and about three seconds is quoted for the production of a full page.

Overall dimension of the cased version is 250 x 380 x 150 mm.

Dataplot Ltd (CW), 39-49 Roman Road, Cheltenham, GL51 8QQ. Tel: 0242 30030.

## Digitus move

APPLE and Cromemco dealer Digitus has moved from London's Oxford Street to Covent Garden. The new address is 9 Macklin Street, London WC2, and the telephone number is now 01-405 6761.

## Bilingual video terminal for Arabs

A BILINGUAL text processing video terminal capable of displaying mixed Arabic and Latin scripts, is available from Data Systems.

The terminal employs facilities of the 16-bit chip based Delta 7300 stand-alone text processing terminal and for Arabic scripts, the appropriate character generator has been added with three control keys.

They are designated "LATIN", "ARABIC" and "MIXED". In Latin mode, characters are entered on the screen successively from left to right. In Arabic, characters are successively entered from right to left.

When changing from Arabic to mixed, the screen cursor remains in its current position and subsequent key depressions will enter Latin characters. The cursor position after moving all just-entered Latin text to character position to the left of the next character position immediately to the left of the just-entered Latin text, vice-versa when changing from mixed mode to Latin mode.

The normal complement of displayable characters comprises the standard 128 ASCII of alphanumeric Latin characters and symbols plus a set of 65 Arabic alpha and numeric characters, all of which are held in PROM.

As the character matrix on the screen is fully programmable, the Arabic characters are displayed properly joined up.

Other features of the terminal include multiple split screen operation, text memory up to 28,500 characters, multiple character fonts and user programmable function keys.

Delta Data Systems Ltd (CW), Swallowfields, Welwyn Garden City, AL7 1JD. Tel: Welwyn Garden (96) 33553.

## ADVANCED FILE DESIGN—Part 6

by Owen Hanson and Norman Revell

## Reducing the effect of synonyms in direct files

WHEN the number of synonyms in a file has been minimised, all that remains is to ensure that those remaining cause as little delay as possible. There are two ways of doing this: 1. Loading the most-referenced records first; and 2. Ensuring that synonyms are quickly retrieved.

**Access frequency loading** It is often said that "90% of accesses are to 10% of records" or "80% of accesses are to 20% of records" or some similar split. When this applies, there is clearly a benefit to be gained by loading the most referenced records first.

The size of this benefit in the 80/20 case can be judged from Diagram 1, which appeared in Basic File Design. An interesting

point here is that the benefit increases with increasing bucket size up to about six records per bucket. An analysis of the size of benefit to be expected in any given case is given in 1, a City University Business School working paper.

For the 80/20 case, and bucket sizes of six or more, accesses to synonyms are reduced to one quarter of the figure recorded in the random case. When 90% of the accesses are to 10% of records, buckets of size five or more will show a reduction to one ninth of random access figures.

These results are dramatic, and allow 90% to 95% packed files to give as good a performance as conventionally-loaded

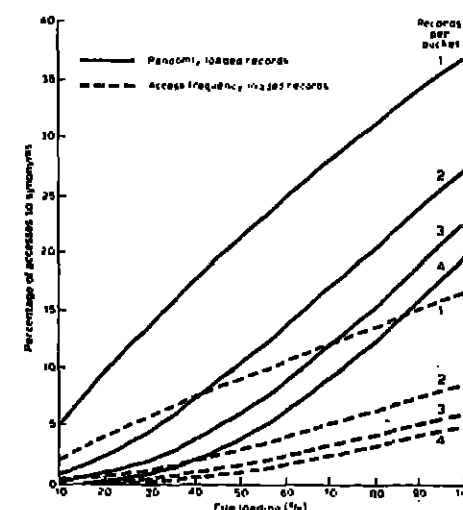


Diagram 1. The effect of access frequency loading (the 80-20 case).

files of 70% to 75% packing. The user will want to know how to get these results, when it is not going to be possible, and any drawbacks involved.

1. Information required. Data on the frequency of accesses to the file has to be obtained. When a file is first set up, a guessimate is as much as can be expected, but data can be collected in one of two ways.

If records are read and then written back, an additional single or double byte field can be added to the record, set up as binary zeroes and incremented each time the record is updated. After sufficient time has elapsed to give a large count in the most referenced records, the file is sorted into descending count field order and reloaded. The counts may be recorded and re-zeroed, or continue. Once it is clear that the access frequency pattern is reasonably stable, the count fields can be used for other purposes.

If the records are only referenced, this method involves an additional rotational delay just to update the count field. In this case it is better to use an ancillary file, consisting only of record keys and count fields, and probably organised in indexed sequential form, to collect the data. Its small size ensures rapid access. Otherwise the process is just as described above.

2. Unsuitable files. If a file is very variable in access pattern or if it has a short life, this sort of data is not obtainable. The designer will have to accept that the normal conditions of random access will apply.

3. File degradation. Additions to an access frequency loaded file will generally be active, as they are new customers, products and so on. They will certainly be a random mix, and will include a proportion of very active records. This leads to rapid degradation of the file, the extent of which is shown in Diagram 2. The file will still require less accesses to synonyms than a conventionally loaded file, but the advantage grows less as more random additions are made.

Diagrams 3 and 4 show the accesses to synonyms as a result of normal loading, and 60/40, 70/30, 80/20, 90/10 and 99/1 case access frequency loaded files for single and 10 record buckets in the range 65%-100% packing. Random additions are shown as dashed lines, with the figures on the right showing the packing density from which random ad-

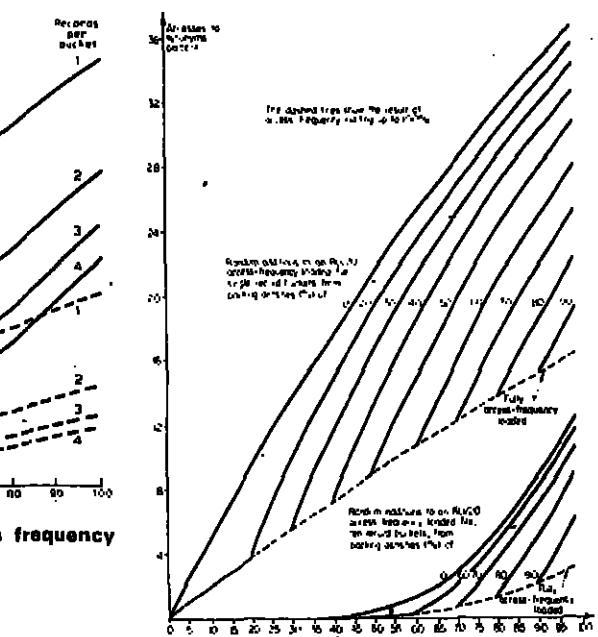


Diagram 2. The effect of bucket size on random additions to access-frequency loaded files.

ditions were made to the 90/10 case. One of these dashed lines, or lines similar to them, will be followed as a result of random additions regardless of the starting point, as they are a family of curves that do not overlap.

Summing up, additions to and deletions from a direct file do not alter the performance of conventionally loaded files, but will degrade an access frequency loaded file. The ideal file for this purpose has a static record set without additions or deletions.

**Synonym retrieval** The other area that can improve performance of direct files is that of synonym storage. Three methods of handling synonyms are widely used; these are progressive overflow, chaining and tagging. The last two are shown in Diagram 5.

1. Progressive overflow. Records can be stored in the next available position following their home bucket. This has the advantage that no complex links are required, but means that there is no indication that a synonym exists. A reference to a record that is not in the file would not be detected as an error until the whole file had been searched.

In addition, if a home record in an address with synonyms is deleted a synonym has to be located and put into the home position, otherwise it will appear that the address is free, and no synonyms exist.

2. Chained records. In this case the last home record is linked to the first synonym, the

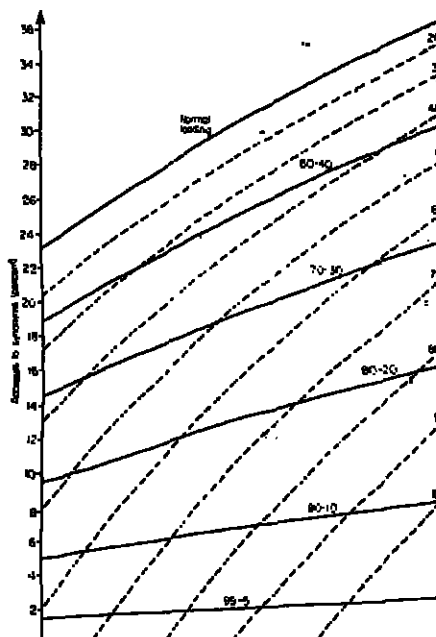


Diagram 3. Single record buckets.

clearly shown here; all the tags take up space in the home record, so their number should be kept to a minimum. Little work has been done on tagging, but the method always outperforms the other two. It is also more robust and quicker to amend than chaining, when a record has been added or deleted.

In the last three parts we have looked at direct files in detail. For enquiry systems these files will always provide more rapid access than any other. However, they do not provide rapid sequential access, and allowing for adequate security can be a problem. In Part 7 we shall examine indirect sequential files, which give an effective compromise when mixed sequential and direct references are required.

**REFERENCES** 1. Improving the Efficiency of Randomly Organized Files by Loading in Access Frequency Order, O. J. Hanson, City University Business School working paper, obtainable from the Librarian, at the school. 2. An Indirect Chaining Method for Addressing on Secondary Keys, R. Johnson, CACM, Vol. 14, No. 5, May 1961, 218-222.

## CONFERENCES

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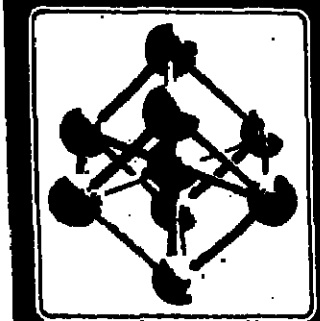
The fourth symposium on computational statistics, Compstat 1980, will take place at Edinburgh University from August 18-22. The conference should be of interest to both theoreticians and practitioners in the fields of computing and statistics. Papers will be presented by authors from Europe and elsewhere on topics including current methodology used in teaching, research and industry; the relative strengths and weaknesses of common statistical packages and new techniques. It is sponsored by the International Association for Statistical Computing. Details from Compstat 1980, c/o Director, Program Library Unit, University of Edinburgh, 18 Buccleuch Place, Edinburgh.

## Running a plant data system

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Diagram 4. Ten record buckets.

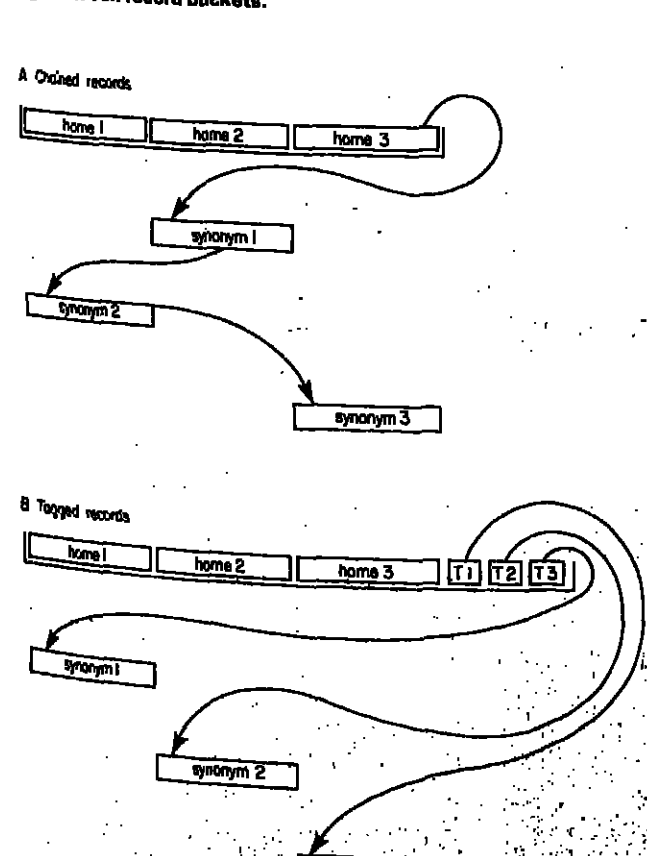


Diagram 5. Note that chained records in A require only a single link field in the home address. Tagged records as shown in B require a link field for every synonym, but avoid following a chain of records.

## BASIC FILE DESIGN

A new introduction of Basic File Design is now available and copies may be ordered from the General Sales Manager, IPC Electrical and Electronic Press Ltd, Dorset House, Shaftesbury Street, London WC2 1JU. Price: £1.90 each including postage.

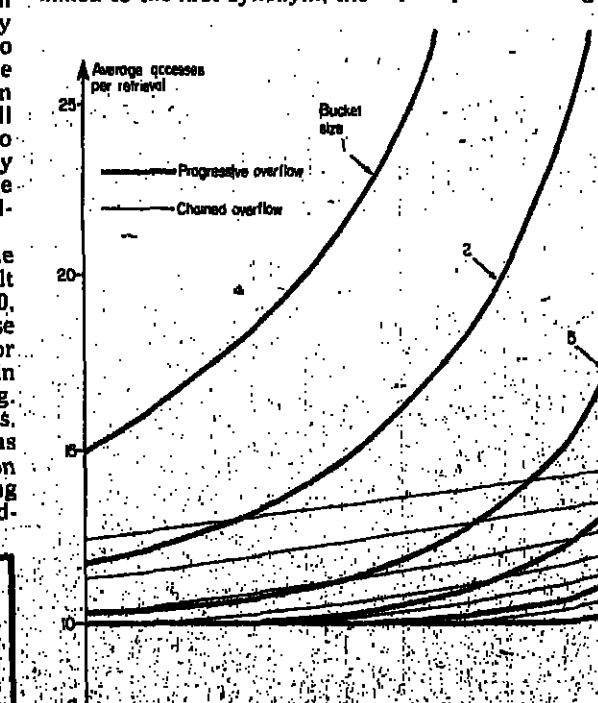


Diagram 6. Results achieved for various bucket sizes and packing densities.



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Denise Smith 01-261 0028  
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Owen Kelly 061-272 4211  
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## OPERATORS

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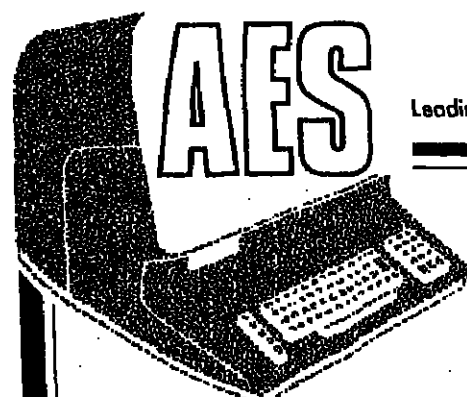
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REF S2/1301

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Interested parties should send their curriculum vitae to Top Jobs who will treat it in the strictest confidence. Reference AES11

Top Jobs s.p.a. Bd M. Lemonnier 91-97, 1000 Brussels. Telephone 02-512 98 72



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For systems analysis and programming in information and technical applications. Experience with PL/1 on large IBM 370 and strong interest in the data base management techniques required. University degree and several years' relevant experience essential. Initial contract two years, annual emoluments US\$24,000 approx. additional allowances if married. Travel and removal expenses paid. Six weeks annual leave. Send curriculum vitae under VN 12/80 to Division of Personnel, International Atomic Energy Agency, P.O. Box 100, A-1400 Vienna, Austria.

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(DR/786)	Senior Analyst ICL environment	c £7000
(DR/787)	24 + months IBM experience	to £6500
(DR/788)	18 + months ICL experience	to £6000
(DR/789)	18 + months IBM background	to £6400
(DR/770)	24 + months ICL experience	to £6500
(DR/771)	18 + months ICL orientated	to £6000
(DR/772)	24 + months IBM environment	to £6300
(DR/773)	18 + months IBM orientated	c £6000
(DR/774)	24 + months IBM (CICS)	c £6500
(DR/775)	Firm ICL background	c £6500
(DR/776)	Firm experience (any mainframe)	c £6500
(DR/777)	Firm IBM background	c £6000

#### PROGRAMMERS

(DR/778)	18 + months IBM CICS experience	c £6000
(DR/779)	Firm IBM COBOL/ASSEMBLER	to £6500
(DR/780)	12 + months ICL COBOL	to £6200
(DR/781)	18 + months IBM experience	to £6000
(DR/782)	18 + months ICL COBOL	to £6400
(DR/783)	24 + months IBM/ICL COBOL	to £7000
(DR/784)	24 + months ICL COBOL	to £6000
(DR/785)	Senior Programmer IBM environment	to £6400
(DR/786)	12 + months IBM COBOL	to £6500
(DR/787)	12 + months IBM COBOL	to £6500
(DR/788)	18 + months large mainframe (COBOL)	to £6000
(DR/789)	18 + months ICL COBOL	c £6300

### MANCHESTER AREA

#### ANALYSTS

(DR/790)	12 + months any mainframe	to £5300
(DR/791)	24 + months ICL environment	to £6200
(DR/792)	24 + months IBM background	to £7000
(DR/793)	Firm ICL background (degree required)	£ Neg.
(DR/794)	18 + months IBM environment	to £6500
(DR/795)	24 + months ICL background	to £6500
(DR/796)	Sales support (will travel)	to £7500
(DR/797)	IBM background	to £6000
(DR/798)	18 + months mini background	£ Neg.
(DR/799)	Experienced IBM analysts	to £7000
(DR/800)	Senior IBM positions	to £7800
(DR/801)	Experienced analysts (any mainframe)	to £7000
(DR/802)	ICL background	to £6400
(DR/803)	20 + months any background	to £6000
(DR/804)	18 + months IBM environment	to £6500

#### PROGRAMMERS

(DR/806)	Sales Support Position	£ Neg.
	Datapoint experience required	+ car
(DR/808)	Senior position IBM COBOL/ASSEMBLER	to £7000
(DR/807)	12 + months ICL COBOL	£ Neg.
(DR/808)	18 + months IBM systems experience	to £7000
(DR/809)	24 + months ICL environment	c £5500
(DR/810)	Sales support (will travel)	to £7000
(DR/811)	3 + years IBM COBOL/ASSEMBLER	to £7000
(DR/812)	24 + months ICL COBOL	£ Neg.
(DR/813)	Senior IBM positions	to £6000
(DR/814)	IBM assembly position	to £5500
(DR/815)	18 + months any mainframe	£ Neg.
(DR/816)	18 + months COBOL	c £5500
(DR/817)	12 + months ICL COBOL	c £4700
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(DR/821)	2 + years commercial plus major projects experience	to £8000
(DR/822)	18 + months (all data processing background)	to £7000

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(DR/823)	2 + years systems programmer PL/1, CICS, DOS	to £8000
(DR/824)	1 year minimum - all grades PL/1, or COBOL	to £8000

#### CAMBRIDGESHIRE CONTACT

ROGER PICKIN

### LEEDS/BRADFORD AREA

#### ANALYSTS

(DR/825)	4 + years (including programming background)	£7000
(DR/826)	2 + years financial systems - IBM site	to £7000
(DR/827)	2 + years commercial systems	c £6500
(DR/828)	18 + months (plus programming background)	to £6500
(DR/829)	2 + years financial systems (including programming background)	to £7500
(DR/830)	2 + years (including ASSEMBLER programming background)	to £7500
(DR/831)	2 + years commercial systems (with programming background)	£ Neg.
(DR/832)	3 + years manufacturing systems	c £7000

#### PROGRAMMERS

(DR/833)	24 + years COBOL	c £6000
(DR/834)	12 + months IBM COBOL	£ Neg.
(DR/835)	2 + years COBOL on any mainframe	c £5500
(DR/836)	All levels PDP BASIC	to £6000
(DR/837)	18 + months ICL COBOL - 2900 site	to £6500
(DR/838)	12 + months COBOL on any hardware	to £5500
(DR/839)	2 + years NCR COBOL	£ Neg.
(DR/840)	3 + years COBOL supervising - ICL site	to £6500
(DR/841)	2 + years ICL COBOL	c £5500
(DR/842)	18 + months COBOL on any mainframe	c £5500
(DR/843)	2 + years ICL COBOL	£ Neg.

### TYNE & WEAR AREA

#### ANALYSTS

(DR/844)	18 + months commercial systems	to £6500
(DR/845)	2 + years financial systems	to £7250
(DR/846)	3 + years manufacturing systems	c £7500
(DR/847)	2 + years (including COBOL programming background)	c £6800
(DR/848)	3 + years manufacturing systems	£ Neg.
(DR/849)	4 + years manufacturing systems	to £8500
(DR/850)	2 + years production systems	to £7500
(DR/851)	2 + years (including programming background)	c £7000

#### PROGRAMMERS

(DR/852)	2 + years COBOL on any hardware	c £5500
(DR/853)	12 + months IBM COBOL	£ Neg.
(DR/854)	3 + years PL/1	c £6500
(DR/855)	2 + years IBM COBOL	to £6500
(DR/856)	3 + years ICL COBOL	c £6000

### GLASGOW & WEST OF SCOTLAND AREA

#### ANALYSTS

(DR/857)	3 + years manufacturing	c £7000
(DR/858)	2 years commercial systems	to £6500
(DR/859)	2 years IBM preferred	to £6500
(DR/860)	2 + years analyst programming any machine	c £6300
(DR/861)	3 years general commercial systems	c £6850
(DR/862)	18 months analyst programming	to £6000

#### PROGRAMMERS

(DR/863)	3 + years IBM systems programming	c £7500
(DR/864)	4 + years CICS, DL/1	to £8500
(DR/865)	2 years IBM 370 systems programming	c £6500
(DR/866)	3 + years COBOL, any hardware	c £7000
(DR/867)	3 years COBOL, any mainframe	to £6750
(DR/868)	3 + years COBOL IBM preferred	to £7250
(DR/869)	18 + months COBOL, IBM, ICL	c £5800
(DR/870)	3 + years PL/1	c £7750
(DR/871)	2 + years IBM COBOL	£ Neg.

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Candidates for these posts should have some solid systems experience, gained in a commercial or financial environment, and the ability to communicate with the users and to understand their needs. Work will be in project teams of Analysts and Programmers so a good programming appreciation would be valuable. Analysts will either be part of a team run by a Senior Analyst or Project Leader or be controlling small developments themselves. Career development is encouraged so there are excellent promotion possibilities.

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An excellent salary will be offered plus benefits expected from a large company including flexitime, subsidised canteen, discount card, sports facilities, etc.

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Salary within Grade AP4 (£4,844-£5,087 p.a.) (National Salary Review awaited). Generous relocation package/temporary housing in an appropriate case. Closing date - 24th March, 1980, quoting Post Number 435.

Convening will disqualify. Application form and job description from the Personnel Office, Borough Secretary's Department, Civic Offices, Riverside, Stafford ST16 3AQ. Tel: Stafford 3181, Ext. 346.

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We are recruiting at all levels from senior programmer to project leader for work in the UK and abroad.

The salaries, dependent upon seniority and experience, are only part of the attractive package. There are perks like profit sharing, relocation expenses, site work allowances, PPP medical cover. There is a company car scheme for the more senior positions.

If you are one of the professionals we want please reply to any of our offices, by post or telephone for an application form.

Barbara Daniel, DAI Limited, Axill House, 24 Warwick Street, London W1R 8RB. Tel. 01-734 5488

Patricia Hewitt, DAI Limited, Alpha House, Rowlands Way, Wythenshawe, Manchester M22 5RG. Tel. 061-438 3122

Roy Hudson, DAI GmbH, Hammerweg 1, 5070 Neuhausen, N. Rhine, West Germany. Tel. 05122-2200

**JBA**

## Operating Systems Specialist

Munich

£30,000 - £33,000

A German specialist systems consultancy comprising a small team of computer technologists require a consultant who has a deep understanding of Mainframe operating systems.

Of particular interest will be experience in the multi-tasking, remote multi-access software handling areas of an operating system, also dual processor software interfacing, etc. Opportunity to acquire a very high standard of living and a remarkable career at the centre of advanced system design work.

Contact: Andy Wright or Mike Creamer

## SNA Software

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from c. £18,000

Experience gained of working on modifying and implementing several elements of an SNA network, at Systems Programmer level, is very much in demand in various parts of Europe. Typically, a big user will be starting development of a SNA system based on an IBM 4300 under DOS/VSE - the problems that this type of development have are often extremely complex and challenging, but very often the expertise is simply not there to cope. If you feel you can contribute in this area, and are considering spending some time on the Continent (1-3 years), call to discuss the possibilities.

Contact: Andy Wright

## Micro-Systems Designers

Germany

£16,000+

A German based consultancy is recruiting a team of designers to work on a variety of projects for leading companies in that country. They are not necessarily seeking individuals with extensive experience. 2 or 3 years is considered adequate.

The work will involve Intel 8080 or Texas Instrument components and a background acquired in software or electronic design aspects is acceptable providing a proven creative approach to work is a dominating feature.

Contact: Mike Creamer

## Sizing and Performance Consultant

London

negotiable to £11,000

Our client is a major computer manufacturer, whose much-publicised success in the market place is creating a further demand for quality JIP professionals. In particular they are looking for a Consultant to have specific responsibility for the sizing and performance aspects of mainframe proposals and implementation.

Candidates should have a thorough knowledge of the interaction of computer hardware and software systems. Any experience of system timing, configuration exercises, or evaluating manufacturers hardware and systems proposals would also be relevant. Candidates must have the ability to present and justify their technical solutions.

Contact: Bernard Kiernan

## Assistant Software Manager

Hertfordshire

up to £10,000

A well-known, multi-product manufacturing organisation require a senior person in one of their divisions to assume responsibility for all software used or connected with their products.

The work will be largely administrative, dealing with tenders, maintenance and modifications, proposals, standards, and attending committees and working parties. Applicants must have sound technical software background, preferably electronics based, and the maturity to manage and control the activities of others.

Contact: Mike Creamer

## Customer Engineers

London, Home Counties & Europe £8,000 - £12,000

We have a number of clients, both computer manufacturers and services organisations, who wish to recruit Customer Engineers.

The main requirement is for two years experience servicing minicomputers, peripherals and terminals. A formal qualification is preferred but not essential. Two vacancies exist for Engineering Managers and one for a Junior Technician. For further information

Contact: Jim Baker

## Software Designers - Micros

London Based

£6,000 - £9,500

Opportunities exist for real-time programmers to join a small team of software specialists working on the development of communications systems. There are vacancies at several levels but all applicants should ideally have some background in the design and programming of technical applications on mini or micro based systems. Graduates with limited experience will be considered for junior positions.

This is a real opportunity to work in a friendly and professional environment on new technology projects.

Contact: Margaret Stevens

## Sales Support

(Mini Systems)

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A real chance to join an organisation which has grown in influence and whose achievements reflect the acceptance of its products in expanding multinational markets.

If your present responsibility is to develop and implement mini-based commercial business systems and you feel that the next challenge is a move into sales support then our client, a mini-computer manufacturer is able to offer opportunities in this area.

Analysts and Programmers with sound BASIC experience, will be considered for business support positions. A background experience of commercial applications will be an essential ingredient.

Contact: Margaret Stevens

**JAMES BAKER ASSOCIATES,**  
International Personnel Consultants,  
82 Savile Row, London W1.  
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REF: S3/1303

## MYRIAD APPOINTMENTS LIMITED

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(87)

## SYSTEMS ANALYST

CITY to £8,700

We have a requirement for a Systems Analyst with 2 years' design experience to join a progressive IBM installation based in the City. The successful candidate will be familiar with working in a team environment and be able to communicate at all levels. His/her background will include involvement with processing, database and/or real time systems.

## IBM SENIOR PROGRAMMER

SURREY to £7,400

An international manufacturing concern based in Surrey are seeking a Senior Programmer to work on Business Systems. Applicants should possess a minimum of 2 years' COBOL experience gained in a commercial environment and be educated to 'A' level standard. They should also have the ability to supervise and motivate junior staff. All the usual large company benefits apply.

## IBM PROGRAMMER

HERTS. to £7,400

If you have 12 months' PL/I experience, this major financial organisation can offer you the opportunity to join their progressive DP department. You will have gained your experience in a commercial environment, and will possess a mature outlook and the ability to work on your own initiative. In addition to a competitive starting salary (currently under review) the company has a comprehensive benefits package, including a MORTGAGE SUBSIDY.

## PROGRAMMING TEAM LEADER

to £8,000

## SENIOR PROGRAMMERS

to £7,500

BORED WITH MAINTENANCE PROGRAMMING? Our clients in Central London can offer you an excellent opportunity to join their brand new developments team working on exciting new projects. The team leader should have 3 to 4 years' ICL COBOL experience together with proven supervisory experience. Senior Programmers a minimum of 2 years' sound ICL COBOL to work within a team. Benefits include the above generous salaries, flexitime of 35 hours a week, season ticket loans and staff canteen.

Ref: GB03/1

## PROGRAMMING TEAM LEADER

CITY to £8,250

Large company situated in the City are looking for a programmer who has at least 4 years' experience with ICL COBOL and has led a team of Programmers on a project. Real time or Plan experience an advantage. Benefits include MORTGAGE scheme, non-cont. pension, free lunches and flextime.

Ref: GB01/2

## ICL COBOL PROGRAMMER

CITY to £7,800

Programmers wanting to consolidate their careers with this City based company should have 3 or more years' COBOL experience with PLAN or VDU experience as an added advantage. Benefits include bonus, free life insurance, sub. canteen and non-cont. pension.

Ref: GB02/3

## IBM RPGII PROGRAMMER

CITY to £8,000

This progressive well established organisation, based in the City, wish to recruit a key member for a small programming team. The successful candidate will be presentable and capable of dealing with clients at all levels. The rewards with this company include a subsidised canteen, L.V.s, accident insurance, cont. pension together with an excellent starting salary.

Ref: GB03/2

## IBM RPGII PROGRAMMER

LONDON to £7,000

Our clients based in London have a vacancy for an RPGII Programmer with at least 12 months' sound experience on the IBM range of machines. The rewards within this company include non-cont. pension, free life insurance, staff canteen and staff discount shop.

Ref: GB03/3

## IBM RPGII PROGRAMMER

WEST LONDON to £6,000

The fast expanding and well established organisation based in West London is looking for a candidate to join a small programming team. Applicants should have at least 12 months' RPGII programming experience. Fringe benefits include season ticket loan, cont. pension, flexitime, L.V.s and 4 weeks' holiday.

Ref: GB02/5

## MINI PROGRAMMERS

LONDON to £8,000

We have a number of requirements for programmers with experience gained in a mini-computer environment. Whatever your background if you are seeking more responsibility, more prospects or even better remuneration/benefits (subsidised mortgage?), contact us now to discuss the opportunities.

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London W1P 9AF  
Tel: 01-636 7584 (24 hrs)

(76)

## Opportunities in Ministry of Defence

## Computer Scientist

Institute of Naval Medicine,  
Alverstoke, Gosport, Hants

... to be responsible within the Statistics Section for operating and developing the use of the terminal link to an ICL 1902 computer, the Wang System 2200B, and the Data General Nova System. It will be essential to develop and acquire software hardware for processing batch and on-line data from medical and surveys. The successful candidate will provide programme support to scientists in medical and related fields, possibly during experimental trials.

Candidates should have an Honours degree or equivalent in a relevant subject and programming experience including a working knowledge of FORTRAN. Appointment as Higher Scientific Officer or Scientific Officer according to qualifications and experience. Ref: SA/8/EG.

## Computer Scientist

Institute of Naval Medicine,  
Naval Radiological Protection Service

... to provide computing support to marine environment radioactivity monitoring surveys. The work will involve maintaining and developing computer software, assisting with radioactivity counting problems maintaining a data bank for radioactivity holdings and waste disposals reported by other MOD establishments and recommending improvements in computer procedures and equipment.

Candidates should have a Degree/HND/HNC in a relevant subject and a working knowledge of FORTRAN. Appointment as Scientific Officer. Ref: SA/9/EG.

## Data Processing Section Manager

Royal Artillery Range, Benbecula,  
Western Isles

... to be responsible for the general management and supervision of the DP section. The work involves post-flight, of missiles, estimating splash point and analysing radar returns tracking missiles, discussing new software with contractors and advising on DP requirements. In addition, the successful candidate will specify and design new software to cover introduction of new weapon systems, targets, range reports and off line data processing of firing results.

Candidates should have a Degree/HND/HNC or equivalent in a relevant subject. At least 2 years' relevant post-graduate experience essential. Appointment as Higher Scientific Officer. Accommodation available. Ref: SA/1/FAG.

## Computer Scientist

School of Signals  
Blandford Camp, Dorset

... to provide software support to a message switching system. Involve responsibility for advising on testing and implementing changes to the existing system and ensuring that user requirements are met. Candidates should have a Degree/HND/HNC in a relevant subject and at least 2 years' post-graduate experience. A knowledge of Pascal and design of computer-based communication systems essential. Appointment as Higher Scientific Officer. Ref: SA/2/VEW.

SALARY (under review), HSO £5095-£8735; SO £8950-£12415 normally under 30; Promotion prospects. Non-competitive pay scheme.

Application forms (for return by April 8, 1980) to Ministry of Defence, CMS/103, Room 310, Savoy Hill, London WC2R 0BX. Please quote reference.

Scientific  
Civil Service

## FIELD SERVICE ENGINEERS

New Opportunities £6,200 + OT + CP

New opportunities have arisen in London and East Anglia as a result of expansion of our successful British Mini Computer Manufacturing young and dynamic company offers you the chance to develop your career in Mini Computers at the top end of the market.

If you have or are looking for experience in Computers and want a stimulating environment with prospects for future advancement, you can handle the above challenge.

Consultant's Ref: EK2082

AN EXECUTIVE (KINGSTON) LTD. 01-500

## SOFTWARE ENGINEERS

Salaries to £10K

Systems Designers Limited is a British Computer Systems Consultancy which during the 11 years it has provided the industry with professional support, has established the highest expertise and credibility in the field of mini and micro based systems. During this 11 year period the company has grown to well over 200 professional staff whilst retaining its independence and its informal, though efficient, way of working. The Company is still growing with offices in Camberley, Frimley, and Manchester controlling a wide variety of work in UK, France and the U.S.A.

Currently we require software engineers to help us solve the theoretical and practical problems of this high technology industry, mainly in the areas of:

## Industrial

Process control and monitoring, real-time data analysis, image processing, distributed microprocessor systems, information processing, message switching, protocols.

## Military

Avionics, Naval and Radar systems, complex rigs, simulators, command and control systems, modelling.

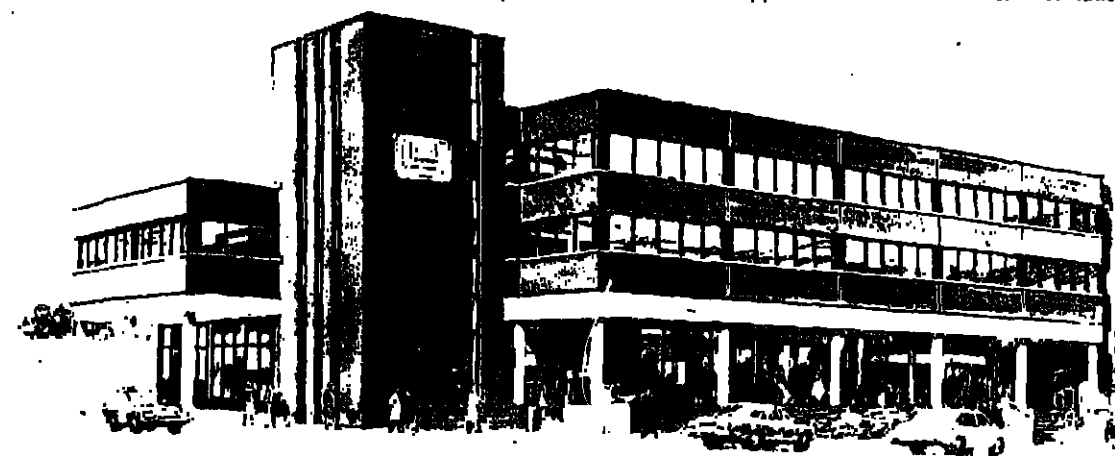
We can offer excellent career opportunities to work in a wide variety of applications. So, if you have a good academic background and between two and eight years experience especially in mini or micro computer systems using

- CORAL 68
- MASCO
- ASSEMBLERS

We will be very pleased to hear from you.

The Company runs productivity bonus, insurance and pension schemes and also offers relocation assistance.

Telephone Sue Watts for an application form and further information about the Company or write to:



Bill Hockey  
Operations Director  
Systems Designers Limited  
Systems House  
1 Pembroke Broadway  
Camberley  
Surrey  
GU15 3XH  
Telephone or Freephone  
Camberley 3179

(69)

Systems Development Analyst  
IBM System 38

Our client is an International Travel Organisation specialising in the arrangement of travel packages. The Data Processing Department plays a key role in supporting the whole range of company's activities and is receiving delivery of one of the first IBM System 38's of 1980. Currently running IBM System 3 Model 10, they are seeking to appoint a Systems Development Analyst to join a young and progressive department. The review of all existing systems is scheduled for early 1981 with a view to developing a totally integrated business control and reporting support facility. Prior to implementation of the System 38, master file restructure and key to disc conversion will take place. Ideally, applicants will possess the following attributes; but we will also consider people with lesser experience who show potential.

- \* The ability to write and present program and system specifications
- \* A sense of humour and good communicative skills
- \* Two years commercial RPG II programming.

Located near Croydon, close to the Kent/Surrey border, the offices are easily accessible from both London and the South East. The successful applicant will receive a generous starting salary, relocation assistance where necessary and a full range of company benefits. Full training will be given and there are excellent opportunities for career advancement within this expanding organisation. For immediate consideration, and to arrange initial interviews, telephone Rex Ashcroft, or write quoting Ref: ARA 3083.

Lloyd Chapman  
Associates

125, New Bond Street, London W1Y 0HP 01-4081670

THE UNIVERSITY OF NEW ENGLAND  
COMPUTER CENTRE

The Computer Centre provides the main computing facility for the University's research and teaching effort. This facility is based on the largest DECsystem-2060 multiaccess computer system in Australia (2 MBYTES of memory, 600 MBYTE disc system).

In order to meet increasing user demands the Computer Centre is seeking applications from suitably qualified persons for the following newly created positions:

## 1. SYSTEMS PROGRAMMER

To maintain and develop system software on the DECsystem-20. Applicants must be familiar with DEC software including the TOPS-20 operating system and attendant software, including MACROS-20. Experience with POP 11 RSTS/E operating system or communications techniques would be advantageous.

## 2. APPLICATIONS PROGRAMMERS

To maintain and develop software required for the University's teaching effort. Applicants should have two years' practical programming experience using FORTRAN and COBOL language systems. Experience of international packages in the statistics, information retrieval or financial modelling areas would be advantageous.

Salary Range: A\$17,870-A\$20,322

Closing Date: April 11, 1980

Position No. 520

Internal enquiries may be made to the Centre Director, Mr. Ian Ellis, telephone (087) 72 2911, extension 2287.

Interviews will commence in London at the end of April, early May.

Applications, including the names and addresses of two referees and stating the Position No., should be sent to the Staff Officer, The University of New England, Armidale, New South Wales, 2351, Australia, prior to the closing date.

ARMIDALE, N.S.W. 2351

AUSTRALIA

Computer Operators  
Here's a really worthwhile opportunity

It's a job which will put you right in among some of the most exciting electronics development projects in the country today. At Marconi Avionics in Borehamwood, Herts, we're looking for a Senior Operator and an Operator to join the DP team in our Airborne Systems Division where we have six GEC 4000 computers backed up by some 50 VDU's and extensive peripheral and support equipment.

For the Operator job you'll need to have at least six months' experience and for the Senior Operator position a minimum of two years, preferably including

MARCONI  
AVIONICS

Write with details of experience to Chris Hill at Marconi Avionics Limited, Elstree Way, Borehamwood, Herts. Telephone: 01-953 2030 ext. 3449. Alternatively, telephone 01-207 3455 anytime. Please quote ref: MA 8016.

no price list



## If you're on form... ...fill in this one.

If you're performing really well in your present job, you'll be keeping your eyes open for something better.

But being a top performer, you've got better things to do with your time than pore over pages of job ads and make dozens of phone calls.

So to save time, and to get yourself lined up for some of the best jobs going, just fill in our application form.

We'll then get back to you fast with details of jobs that are exactly right for you.

### Personal

Please write in ballpoint, using block capitals.

Surname \_\_\_\_\_ Forenames \_\_\_\_\_ Mr/Ms \_\_\_\_\_

Address \_\_\_\_\_

Tel. Home \_\_\_\_\_ Office (discretion will be used) \_\_\_\_\_

Age \_\_\_\_\_ Nationality \_\_\_\_\_ Car? \_\_\_\_\_

Are you prepared to relocate in UK? ☐ Abroad? ☐ (tick box)

### Experience

Place no. of years in box,  
e.g. IBM 360/370

4

#### Machines:

Please specify model.

IBM 360/370

IBM others (specify) \_\_\_\_\_

ICL 1900/2900

ICL others (specify) \_\_\_\_\_

Honeywell

Univac

Burroughs

PDP

Other mainframes

\_\_\_\_\_

Other mini-computers

(specify) \_\_\_\_\_

#### Languages

Cobol

Plan

Assembler

PL/I

Fortran

Filetab

RPG/1

Auto/easy/user code

Others (specify) \_\_\_\_\_

#### Operating Systems

DOS

OS

George (specify) \_\_\_\_\_

CICS/HASP/GRASP

DBOMP/MVT/IMS

CMS

Others (specify) \_\_\_\_\_

\_\_\_\_\_

#### Applications

Commercial

Financial

Payroll

Production control

Stock control

Scientific

Realtime

Software

Database

Message switching

Communications

Data transmission

Central process

Teleprocessing

MIS/CPA/PERT

Magnetic tape

Disk

Others (specify) \_\_\_\_\_

\_\_\_\_\_

#### Job Titles

Project leader

Systems analyst

Systems engineer

Analyst/programmer

Systems programmer

Programmer

Operations supervisor

Operator

Consultant

Sales representative

Others (specify) \_\_\_\_\_

\_\_\_\_\_

### Position Sought

Please state briefly the type of appointment you are seeking.

Contract? ☐ Permanent? ☐ Either? ☐ (tick box)

Minimum salary £ \_\_\_\_\_ Notice required/Date available \_\_\_\_\_

Signed \_\_\_\_\_ Date \_\_\_\_\_

Cut out the whole advertisement and post to the address below.

**Knight**

**Knight Computer Services Ltd.**

**01-491 4706**

## SYSTEMS ENGINEERS

West Surrey  
c.£6,500 (Under Review)

Our client has grown steadily and must continue to expand to encompass new technology and the world-wide demand for their expertise.

As an independent Systems Company they provide multi-disciplinary teams giving comprehensive service in civil and military operational research, system design and implementation, and project management. Projects span the civil and defence fields at home and abroad, and their highly qualified staff provide imaginative and practical solutions to a wide range of problems.

Engineers are required for system and sub-system design, assessment of performance, definition of interfaces and system interrogation. Experience in one or more of the following would be particularly relevant:

Digital Systems Engineering, Software Definition, Navigational or Weapon Aiming, Electronic Displays, Systems Analysis and Modelling, Avionic Integration, Reliability and Maintainability, Ground Support Equipment.

Benefits include a generous discount towards BUPA, Company Pension Scheme and Lunchtime Vouchers.

Ref. No. 38/11/80

The Central London Headquarters of a well-established international software house network are inviting applications for the following posts to fulfil their planned growth requirements.

## ANALYST PROGRAMMER

to £8,500 p.a.

Applicants should have at least four years' experience in data processing as well as a sound commercial knowledge of mini-computers.

## PROGRAMMERS

to £7,000 p.a.

At least two years' experience is required for these vacancies — preferably on mini-computers. A knowledge of BASIC is desirable although not essential.

The above positions are permanent and offer extremely good long-term career prospects within this fast-moving and progressive company.

The working environment is friendly, and as well as the above salaries there are excellent fringe benefits.

Interviews will be held in London throughout March and offers will be made to successful candidates within one week of interview.

Ref. No. 3A/11/80

## HAVEN INFORMATIX LIMITED

Recruitment Consultants

24 Crays Inn Road, London WC1X 8HR Telephone 01-831 6055 Telex 299639 HAVEN

### RATNERS (JEWELLERS) LIMITED

requires

## PROGRAMMER/ANALYST

London, E01 c. £8,000

Ratners (Jewellers) Ltd. seek a computer programmer.

Suitable candidates for this position will have two or three years' programming experience, preferably covering business accounting and stock control. The person appointed will work on the development of the stock control system as his initial project in Farringdon Road, E.C.1, and later as management trainee.

The appointment carries a salary of approximately £8,000 per annum with 3 weeks' annual holiday (rising to 4 weeks after 3 years' service). The company operates a non-contributory pension scheme.

Applications, giving full personal and career particulars, should be sent in writing, quoting reference R231-W to:

Dr Geoffrey M. Scott  
STOY HORWATH LIMITED  
Management Consultants  
64 Baker Street  
London W1M 1DJ

The College is installing a new ICL 2904 computer for educational purposes. The installation will be based at Bradford College but will service the needs of the Bradford Metropolitan District Colleges.

## PROGRAMMER

Applications are invited from experienced candidates in systems and applications programming.

Candidates will preferably have a knowledge of COBOL language.

The salary for this post will be in accordance with the Conditions of Service, Scale A.P.4.

£4,644-£5,067

Application forms and further particulars are available from the Staffing Officer, Bradford College, Great Horton Road, Bradford, BD7 1A.

Completed forms should be returned to the Staffing Officer, not later than March 19, 1980.

Bradford College

## MYRIAD

## BECOME A SOFTWARE DEVELOPMENT MANAGER

£ NEGOTIABLE + CAR

This position presents an outstanding opportunity for either a Departmental Programming Manager with a technical background or a person experienced in Systems Programming, to take responsibility for an expanding Software Development Team.

Joining a specialist group, the Software Development Manager will lead small teams developing a range of software products on IBM 370 and 4331 equipment.

This position offers an ideal opportunity for a SENIOR SYSTEMS PROGRAMMER who is seeking a positive career advancement into management whilst retaining a full technical involvement.

### THAMES VALLEY

Liaising closely with technical support and marketing personnel to interpret and define future requirements, the successful candidate will contribute to the design of products in addition to identifying improvement potential in existing systems.

Candidates for this challenging role will have a strong IBM ASSEMBLER background, preferably gained at a DOS/VS installation, and possess the personality to motivate and control a fast growing staff of technicians.

To cope with the ever-increasing demand for its products and to maintain its leading position in the software field, the Company has ambitious expansion plans, thus presenting the person appointed with considerable scope for career progression. A good starting salary is further enhanced by a company car and first-class conditions of employment, including generous relocation expenses where appropriate.

REF S1/1303

### MYRIAD APPOINTMENTS LIMITED

30 Fleet Street London EC4Y 1AA Telephone 01-353 0981 24 hours

## If you are going to be big in computers, you have to work with the best, on the best - at ARAMCO.

ARAMCO, the Arabian American Oil Company, is the number one developer of energy reserves in Saudi Arabia.

Its computer controlled oil operations are the largest in the world, using the very latest technology.

They include oil and gas despatching - message switching - royalty metering - plant process control - mechanical warehouse control - oil production automation and energy management (SCADA).

If you are a process computer professional with a BSc or equivalent in Engineering, computer science or related scientific field, this is the once in a lifetime offer ARAMCO is making.

### Process Computer Specialists

- Hardware Engineers

- Software Analysts

- Systems Engineers

- £11,000-£17,400 after tax.

The salaries, depending upon seniority and experience, are only part of the story. ARAMCO offers some of the finest working and living conditions in the Middle East, including recreational facilities such as football, tennis, swimming, golf, squash, English cinema and TV.

There is real opportunity for personal capital buildup. Yet we suspect the biggest attraction is the rapid experience you will gain, working with the very latest computer hardware.

You will be working alongside the world's top specialists and managers in an environment where multi-million dollar decisions are taken faster.

ARAMCO is the place for the self starter who enjoys a challenge and recognition.

If you are one of the ambitious professionals we seek, already you will have worked out how much more this 'state of art' experience can add to your salary potential when you return home.

Appointments are on a single status, renewable annual contracts, with regular paid UK leave. Candidates must be physically fit and hold a current UK driving licence. For further details and an application form please telephone 01-629 2357 or 2358 (quoting reference 6493) or dial 180 and ask the Operator for Freephone 2422, or write with full c.v. to Astral Recruitment Associates, Astral House, 17/19 Maudslayi Street, London W1R 1EY.

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### UNIVERSITY OF READING LECTURERSHIP IN COMPUTER SCIENCE AND MICROPROCESSOR APPLICATIONS RESEARCH ASSISTANT POST IN MICROPROCESSOR APPLICATIONS

Applications are invited from candidates with an interest in both hardware and software for two posts.

(i) Lecturer in Computer Science and Microprocessor Applications. This post is shared between the Microprocessor Education and Support Unit (established within the Computer Centre) to support applications of microprocessors (throughout the University) and the Department of Computer Science (which itself is expanding its interest in digital electronics). Further particulars may be obtained from the Registrar (Room 214, Whiteknights House), The University, Whiteknights, Reading RG6 2AH, by whom applications (two copies) and including the names of two referees should be received not later than 8 April 1980.

(ii) Research Assistant in Microprocessor Applications. This post is held within the Microprocessor Education and Support Unit and the successful candidate will be expected to implement software systems and develop interfaces and communications systems. Salary will be at an appropriate point in the Research and Allied Grades. Applications (two copies) including the names of two referees and quoting reference R231-W should be sent to the Assistant Registrar (Personnel), Whiteknights House, University of Reading, Whiteknights, Reading RG6 2AH and should reach him not later than 8 April 1980. (11)

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WELL - NOW

## Sales Executives

Thames Valley - London - N. Home Counties

Realistic Quota Earnings £15K to £17K + car

Several clients require Sales Executives for products or services. The range covers: mini-computer and terminal systems, word processors, technical programming services in real-time, process control, compilers etc. and telex compatible communications devices.

## Software Manager

Berks. £10,000 + car

A small company (c.£4m turnover) specialising in micro based products in the leisure and medical markets. The company requires strong software expertise gained in a mini or micro development environment.

## Assistant Software Manager

Herts. c.£10,000

An ideal opportunity for an experienced software development person to obtain a management position. The ideal person will have a good degree and several years programming experience, some of which will have been gained on a real-time project. Responsibilities include: man-management of an existing team, specifications, budgeting, standards and maintaining a state-of-the-art awareness.

## Computer Services Manager

Beds. £9,000 +

Our client requires an experienced software specialist who has the rare combination of administrative ability and technical competence. The person appointed will set up procedures for the verification and maintenance of a mini-computer operating system. The work will involve liaison with U.S. and U.K. development teams in providing a smooth running development service.

Apply in confidence to Terry Harvey by sending personal and career details, or contact him for an application form, evenings 6p. Missenden (02406) 4705 or daytime as below.

## Harvey Recruitment

Executive and Consulting Personnel Consultants  
500 Chesham House, 150 Regent Street  
London W1R 6FA Tel: 01-734 5351



M.I.B.F., one of the largest distributors for data recording products in the U.K. and also specialists in supplying advanced peripherals and consumables to Britain's computer industry, have the following vacancies:

### SALESMAN—PERIPHERALS

To be based in Southern England and responsible for selling M.I.B.F. peripherals (printers, disks, VDUs) to end-users and OEMs in South-East England.

The person we are looking for will already have successful sales experience in the computer business and will have sufficient technical understanding to become aware of interface problems and solutions.

This is a recently formed division of the Company with more need for a flexible, 'aware' salesman, self-motivated and able to meet targets without supervision.

Target earnings: £12,000-£15,000.

A company car is provided.

### SALES ENGINEER

To be based at our offices in Harrogate, responsible to the Peripherals Division Manager, this position involves providing pre-sales support for our Peripherals Division involving:

- demonstrations
- interface preparation
- technical projects
- some selling on commission (if suitable candidate)

The ideal candidate will need to be flexible and prepared for reasonable travel in the UK as required. He/she will have an understanding of microcomputers at good practical level, a good 'sales' personality together with some commercial experience either in field engineering or sales support. The position could suit a graduate with 1-2 years' experience.

Salary — £8,000 p.a. and possibly some commission. A company car is provided.

For further information, please contact:



M.I.B.F.  
Peripherals  
Division

Peter Hall  
M.I.B.F.  
Barclays Bank Chambers  
Pegg Lane  
Kirkcaldy  
Tadcaster, North Yorkshire  
Telephone: (0837) 832868

SUPPLIERS TO BRITAIN'S COMPUTER INDUSTRY

(118)

## BECKMAN® DATA PROCESSING MANAGER

Beckman is an international manufacturer of high technology medical and scientific instrumentation. Continued expansion of our European manufacturing operations has created an opportunity for a Data Processing Manager at our Administration Centre.

Reporting to the Financial Controller you will have total responsibility for all future D.P. development which includes implementation of on-line systems, utilizing Hewlett-Packard 3000 equipment.

You should have at least five years experience in a manufacturing environment backed by a sound knowledge of Bill of Material, Inventory Control, and Material Requirement Planning, involving COBOL and Database systems.

As close co-operation with our Data Processing Department in California will be required, you probably will have the opportunity of spending three months in the United States shortly after appointment.

Salary will not be a barrier to the successful man or woman and other important benefits include a free pension scheme, 22 days holiday and a first class relocation package.

Please telephone Glen Davies (01522) 771234 (receiving the charges) or write with full C.V. to:

Elizabeth Paton  
Personnel Officer  
Beckman RHC Limited  
Eastfield Industrial Estate  
Glenrothes  
Fife, KY7 4NG

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### CLASSIFIED COPY

All classified copy should reach our offices no later than 3.30 p.m. on the Monday preceding Thursday a publication. If complete artwork is supplied, 11 a.m. on a Tuesday. Ring Roy Kelly for further details on 01-261 8016.

## SOFTWARE ENGINEERS

At GTE ATEA we have a long history of significant contribution to the development of telephony in Europe and are rapidly expanding our commitment to the public and private markets for processor based communications systems.

This expansion creates vacancies in our development teams for managers, supervisors and experienced software engineers, both here in Belgium and on temporary assignment in the U.S.A.

We seek engineers with two to ten years software experience in real-time systems (depending on job function), or equivalent telephony experience with an inclination towards software. Applicants should be educated to degree or HND standard.

Successful candidates may be offered the opportunity to work for about two years in one of the laboratories of our parent company GTE in the United States before joining our permanent staff in Belgium.

Interested persons should apply in writing, with curriculum vitae, to Mr. L. Luyten, GTE ATEA N.V., Industriepark Klein Gent, 2410 Herentals, Belgium who will treat all applications as strictly confidential.

**GTE ATEA**

## City of Aberdeen

CITY CHAMBERLAIN'S DEPARTMENT

### COMPUTER SECTION SOFTWARE DESIGN & ANALYSIS

SALARY SCALE: £5,382-£7,338 per annum

(Comparability Award is due shortly)

Applications are invited for the above supernumerary post of Analyst/Programmer. The successful applicant will be required to assist the Senior Software Designer in the development and maintenance of installation software, including real-time programs, and should be experienced in PLAN, COBOL, ICL Data Communications Software and George 2+. The duties will also include application analysis. The equipment consists of 2 x 2804 Computers (48K and 64K) with one processor used solely for communications.

A five-day week and a pilot scheme of flexible working hours is in operation. Removal expenses, where appropriate, will be payable.

Applications, stating age, educational qualifications and details of relevant experience, should be lodged with the City Chamberlain, Town House, Aberdeen, AB9 1AH, by Friday, March 28, 1980. (117)

### SENIOR OPERATOR

WISHING TO BECOME SHIFT LEADER

SURREY Circa £8,000 p.a. + Paid Overtime

A rapidly expanding international company with a U.K. head office in Surrey is seeking a senior operator working a standard three-shift system.

The present IBM installation is being upgraded later in the year to the IBM 4341 offering increased opportunities.

The successful applicant will have approximately two years' experience on IBM 370, DOS/VS, POWER/VS and is now seeking promotion to shift leader.

Experience of CICS and T.P. would be an advantage as there are existing links with the Southern Ireland operation plus plans for T.P. links with the European operations.

Apart from an attractive working environment and the opportunity to learn new skills, the benefits also include subsidised meals, free meals when on night shift, free life assurance, part time P.P.T. and a sports and social club.

For further details ring  
JIM FOREY, Operations Manager, on  
01-548 7739

### Computer Programmer Systems Analyst

£6501-£8864 or £5958-£6327 Dorking

For the Headquarters of South Eastern Road Construction Unit, Federated House. To be responsible to Section Engineer (Computers) for providing detailed technical advice on computing and its application to the in-house mini-computer and providing a computing advice service to Sub-Units.

The person appointed will develop and maintain a working knowledge of mini-computer (Mod Comp IV), advise on methods of improving the operating system, job control and programs in current use and should have knowledge of control languages and operating systems preferably in use at SIA and LUCS. Applicants should have a degree in Computer Science, Mathematics or Civil Engineering with several years' computing experience, a working knowledge of FORTRAN and experience of either mini-computers or bureau.

The appointment will be temporary for a period of approximately 4 years but there may be an opportunity for extended employment.

Application form from County Engineer (please quote Post No. 42), Highway House, 21 Cheselton Road, West Ewell, Epsom, Surrey. Tel. 01-394 1788. Closing date: 2 April 1980.



## Midland Recruitment Feature March 20th

For further  
details contact  
**Stan Harris**  
on 021-356 482

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PHONE NOW FOR DETAILS

### Analyst Programmers

£270 per week North West

How about spending at least 6 months with a national company, working with a small enthusiastic team, pulling good money and working in very attractive semi-rural surroundings. If you have experience of IBM 370 OS/COBOL/CICS and DLI, you could start now. But you'll have to phone us now. This is one of this week's best.

£270 per week Yorkshire

Come to the countryside for 9 months and earn yourself a packet! Work on financial applications with very important people. If you've experience with ICL 2976 VMEB COBOL and essentially IDMS, you're just the person we can trust. And you can start now, but only if you phone us now.

£270 per week Midlands

If you rate yourself really highly then we have a company who needs you now. If you can be trusted to work on your own initiative then a place for you definitely exists within a small friendly company for at least 6 months. PDP and DIBOL, at least 5 years experience and a degree are your passport to working on financial and sales support. Phone us now for details.

£280 per week ICL 2960 VMEB IDMS COBOL. Yorks.

£280 per week IBM CICS DLI COBOL Yorks

£280 per week Scientific Fortran North West

£270 per week PDP11 RSX11M Midlands.

£255 per week HP3000 Image Query North West

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available.

Phone now for more information, an informal interview or meeting for this very special opportunity.  
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Birmingham

Knight Programming Support Ltd., Adamson House, Shamley Square, Manchester M14 1RE, and Kensington House, Suffolk Street, Queensway, Birmingham B1 1 1H

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### Programmers

If we can't find you the best jobs, nobody can.

£270 per week North West

We need someone serious. Is it paid? Could you take on a small team bubbling with enthusiasm? We're talking about you working for a national company on a 3 month, possibly renewable basis. Strong PL1 and CICS experience is what we're asking for. In return you get the best. Phone us now and find out.

£255 per week North West

Join one of the friendliest crowds you could ever hope to meet. Enjoy your work on general commercial applications and score with the cash too! All we're asking is COBOL, CICS, IBM 370/138 DOS/VS experience. And what are you gaining? A top class position. Phone us and see.

£255 per week North West

Come to the City and in the big time for a month. Join a really big company but work for a really compact team. HW66, GCOS COBOL, plus experience of DM4 and/or IDS/TDS make you the ideal person. You'd be working on a conversion from IBM 370 so you see it's a very special opportunity. Ring now for details. To start by the end of April.

£280 per week PDP11 Basic Midlands

£280 per week IBM CICS COBOL Various

£270 per week Univac Fortran Midlands

£253 per week HW66 IDS TDS Various

£255 per week PDP11 DIBOL North West

### Design & Analysis

This week's best paid jobs.

Team Leader £300 per week North West

Come and put your stamp of authority on a big company's team. If you have experience of HW66 & DMIV and/or IDS/TDS GCOS and COBOL, you're the person who could create quite a destiny here. There's a 6 month contract starting from the end of April on offer and work on general commercial applications. Give us a ring now for this marvellous opportunity.

Project Leader £300 per week North West

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Systems Designer £280 per week North West

A big international organisation needs you. If you have 4 years technical design experience, can take a project to integrated testing and be involved in stock management and production you're the person we're looking for. Get in at the beginning of something new.

£300 per week Systems Designer IDMS Various

£300 per week Project Leader Designer North West

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£280 per week Senior Analyst HP3000 Various

£280 per week Systems Analyst Maximim Midlands



See Page 121



**JBA****Sales Executive —  
Peripherals****Leeds Based Earnings c. £13,000 + car**

An internationally known peripheral manufacturer is seeking a Sales Executive to work in the YORKSHIRE area. Applicants should have a professional outlook and have had previous sales experience within the computer industry or have a good systems background coupled with the ability and ambition to sell. Good benefits and excellent incentives.

**Systems Design —  
Database****Coventry****c. £7,500**

A large industrial organisation with many diverse interests is seeking a SYSTEMS/DATABASE DESIGNER to assist in the development of a range of commercial applications using on-line and database technology. Applicants should have a good computing background with at least 2 years in systems together with previous database experience.

**Senior Systems Analysts  
Nottingham****c. £7,300**

One of the major IBM users in the Nottingham area is seeking to appoint SENIOR SYSTEMS PERSONNEL to be involved in analysis and design of commercial systems. Applicants should have a good basic education, some programming background and normally at least 7 years systems analysis and design experience. A period in an IBM mainframe installation would be an advantage.

**Financial Systems  
Specialist****Rural Midlands****Neg. to £8,000**

A multi-national engineering company requires a specialist with the ability to identify and develop software for the analysis of corporate financial data. Applicants should have good computing experience with a bias toward financial matters and their related analytical techniques. A knowledge of APL would be advantageous but training will be provided where necessary. Really interesting systems work combined with the opportunity to learn and use an interactive computer language.

**PDP-11 BASIC +****West Midlands****£5,500 - £7,500**

A retail organisation, which is well-known in the high street, is seeking a number of PROGRAMMERS with varying lengths of experience to assist in the development and implementation of a range of new commercial systems. Applicants should have a minimum of 1 years programming experience on a PDP-11/RSTS system using BASIC+. Good benefits combined with the opportunity for personal development within this well-known organisation.

**Systems Programmer  
Rugby****up to £7,000**

A medium size engineering company has a vacancy for a TECHNICAL SUPPORT PROGRAMMER to join a small team responsible for systems software, and to assist in applications programming. Applicants should have a good education with a minimum of 2 years IBM DOS/VS programming experience together with the ambition and ability to work with systems software. An ideal opportunity to develop a career in system software.

To apply for the above positions or for further information please contact: Bev Stevens.

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We have recently installed an IBM System 34 utilising the MAPICS software and we require a Senior Systems Analyst to establish the design, development and implementation of an integrated MRP system.

Applicants should have had at least three years' experience of MRP systems, with a good working knowledge of company systems and procedure within a manufacturing organisation.

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The Personnel Department

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Package includes extremely attractive fringe benefits, excellent working environment with promotional prospects.

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## SYSTEMS ANALYSTS

Two vacancies exist, one for a Senior Analyst and the other for a graduate. Attractive salaries will be paid commensurate with experience.

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The Computer Bureau is operated as a service unit for both academic and administrative departments. Interactive computing facilities are supported by an IBM 370/138 computer with 1-Mb of main memory and a Digital Equipment VAX 11/780, also in 1-Mb form.

In recognition of the increasingly important role of computers and the wider requirements for external services, the College has under consideration a proposal to incorporate a Regional Computing Centre in the Bureau.

The salary scale is: £12,496-£14,431 p.a.

Further particulars and application form are available from the undersigned to whom completed applications should be sent to arrive not later than Friday, April 18, 1980.

M. F. Kelleher  
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You should have the following experience and qualifications:

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- Some knowledge of programming (preferably COBOL).
- Experience of mini-computer systems.
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- Experience in a retailing company would be advantageous but is not essential.

For further information please telephone or write to:

Roger Lawson  
Group Data Processing Manager  
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76, High Street,  
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Function - To lead a team of Programmers engaged in computer systems design and program development.  
Experience - A practical knowledge of COBOL and ASSEMBLER; Systems Design and Project Control. An IBM Mainframe background is essential.  
Salaries - c £7500 + Benefits.

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Function - To be part of a team responsible for the writing and implementation of COBOL/ASSEMBLER.  
Experience - At least two years' practical COBOL and ASSEMBLER either as a Programmer or Analyst/Programmer.

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Function - To aid the user departments in the solution of their business problems and define the necessary data processing service.  
Experience - At the senior level, candidates should be educated to degree standard or equivalent, have at least 3 years' systems analysis experience and a general grounding in a commercial environment (eg: O & M, Accountancy).

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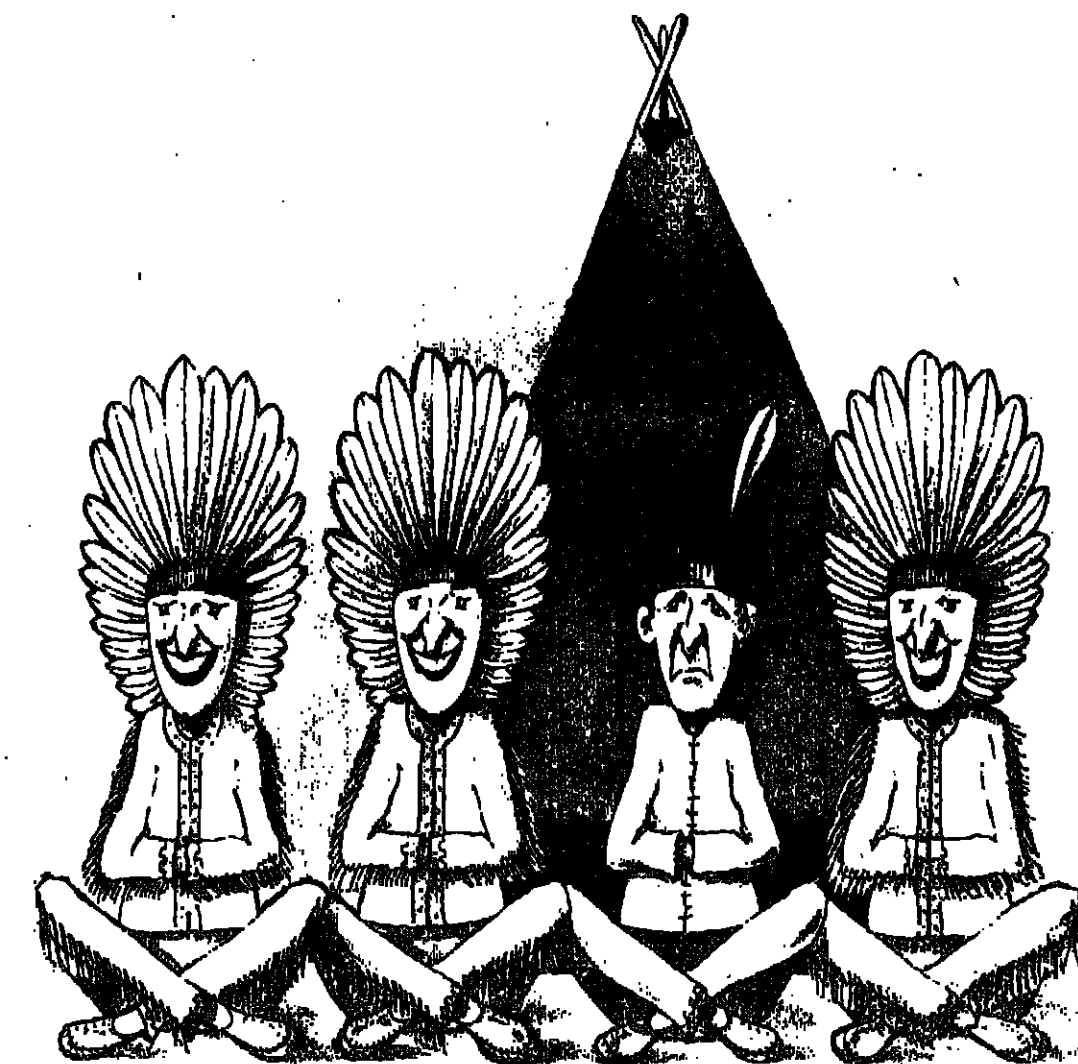
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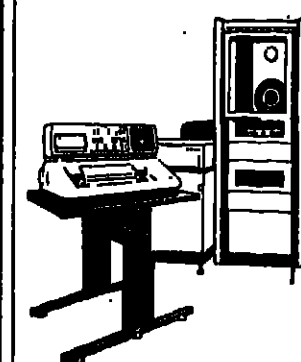
- A good all-round RPG 11 and COBOL background.
- At least three years' CCP experience at a senior level.
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The post calls primarily for a person with extensive "hands on" experience in the field of teleprocessing design and implementation.

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Applications giving full personal education and career details should be sent by AIR MAIL addressed to the Secretary to the Public Service Commission, Post Office Building, Hamilton S-24, Bermuda, not later than April 1st, 1980.

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For just £75 extra, any position advertised in Computer Weekly will also be announced on Prestel screens for five days. The screen announcements will contain the main details given in the Computer Weekly advertisement. And this special computer appointments service will have its own key access number on Prestel.

The Prestel information service is now available in public libraries, universities and computer centres across the country — and many key computer personnel are already regular users. Your advertisement will be telecast on Prestel the day we receive it — up to six days before it appears in Computer Weekly itself — which could enormously increase the speed of response as well as the number of replies.

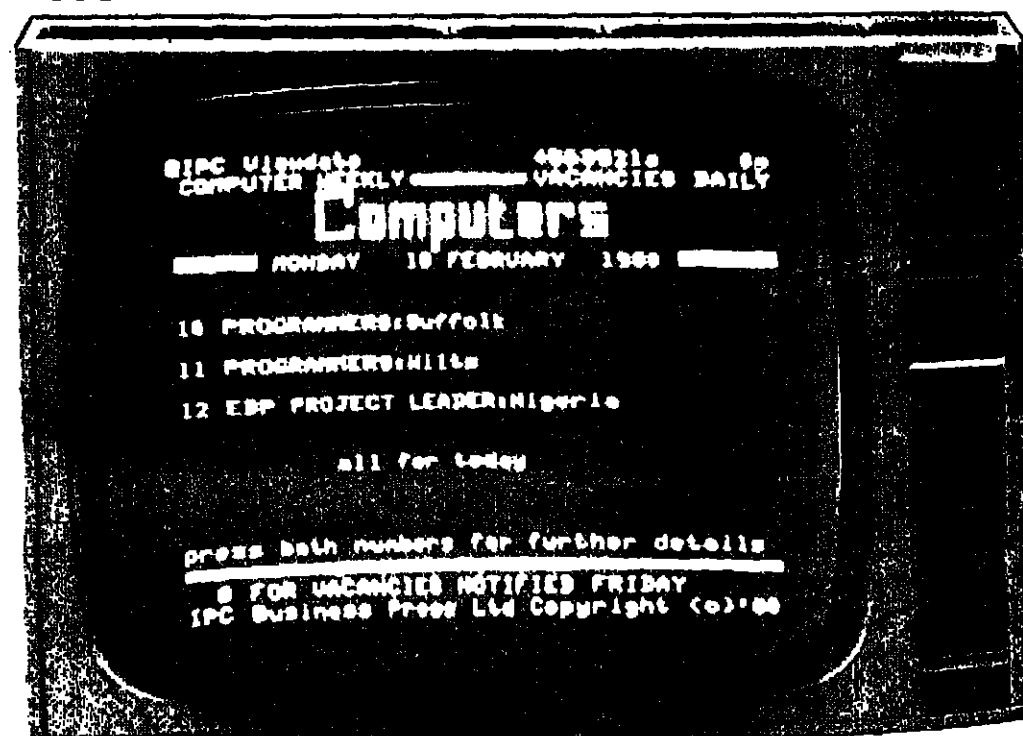
Start your 1980s recruitment programme by harnessing the key information medium of the new decade. Contact Brian Durrant, Classified Advertisement Manager, IPC Electrical-Electronic Press Ltd., Dorset House, Stamford Street, London SE1 9LU. Tel: 01-261 8597.

## COMPUTER WEEKLY

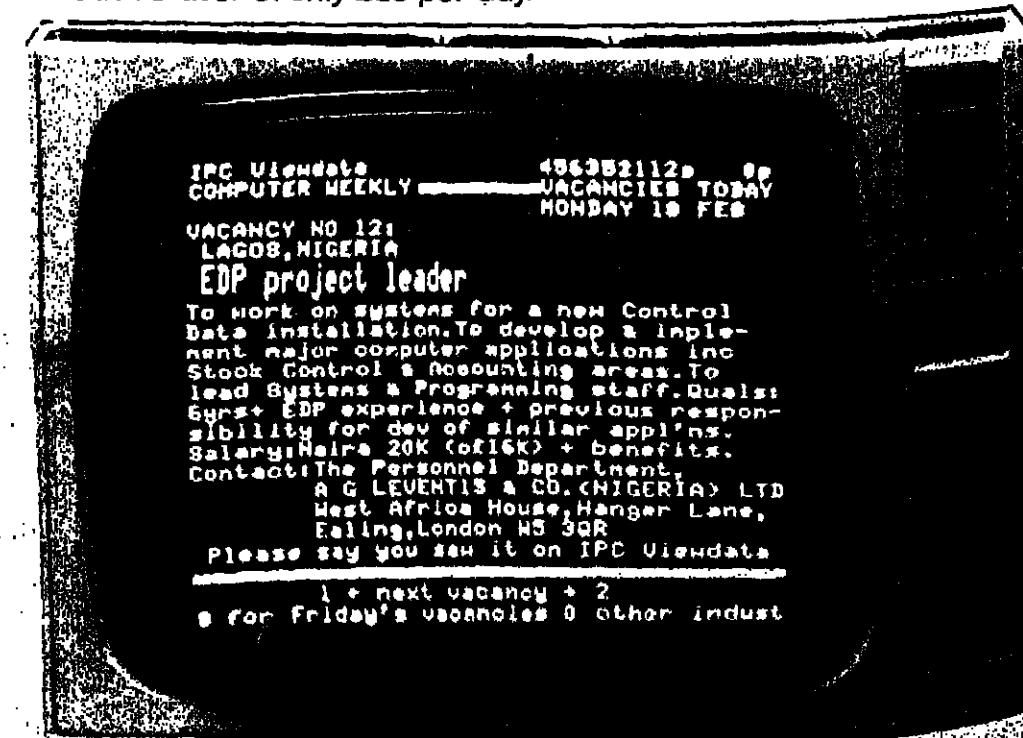
in association with IPC Viewdata

Note: A parallel service is available to Electronics Weekly recruitment advertisers.

### HOW IT WORKS



On dialling the computer appointments number, applicants are immediately informed what jobs are available for the day, and given a key number for each. They can also obtain details of the previous four days' vacancies, so that each job is in effect on offer for a working week, at a cost to the advertiser of only £15 per day.



On pressing the specific job's key number, applicants are given full details of the vacancy (if there's room, all the details that you have in given in your appointments ad) including how, where and when to apply. This amounts to a 5-day recruitment campaign, screened to a highly select audience.

## SYSTEMS ANALYSTS HOLLAND

up to £12,000 neg.

This major Dutch marketing company plan to replace their current system with a 4341 capable of handling a large Database with on-line facilities from remote Dutch and Belgian locations.

Two systems analysts are required to join an existing team developing a package designed for current ordering and invoicing and a central stock system covering a wide range of products.

Candidates should have a minimum of three years' experience coupled with either a programming background and/or commercial experience in accounting or administration. A knowledge of database systems and/or T.P. is required. The company will sponsor machine-orientated training and other supporting computer education.

An excellent salary package is offered including relocation and initial subsistence allowance depending on the particular domestic situation. The Dutch education system is capable of integrating non-Dutch-speaking children into certain schools and the company sponsors employees on a formal Dutch language course. Candidates who could not plan to spend two or more years with the company are unlikely to be considered.

Contact Jack Cowdy, Director  
on 01-603 7335

**Information Processing People**  
55 Pembroke Road, London W8 Tel: 01-230  
Computer Services & Recruitment Consultants **01-603 7335**

UNIVERSITY OF SOUTHAMPTON  
FACULTY OF MATHEMATICAL  
STUDIES  
COMPUTER STUDIES GROUP  
Applications are invited for the posts of  
**LECTURER and  
TEMPORARY LECTURER**  
in Computer Studies in the Faculty of  
Mathematical Studies. The persons  
appointed will be required to teach all  
aspects of computer science at Hon-  
ours level, and to give elementary  
programming courses to students from  
all disciplines. They should have active  
research interests in some branch of  
computer science. A Ph.D. in Com-  
puter Science is desirable, but not  
essential if an applicant has adequate  
relevant experience. The posts are  
tenable from 1 September 1980. The  
temporary appointment will be for one  
year.  
Salary on the scale £5,052 to £10,484  
per annum with U.S.S. superannuation  
benefits. The starting salary will depend  
on age and experience.  
Further particulars are available from  
Mrs. E. C. P. Bess, Staffing Section,  
The University, Southampton SO9  
8NH, to whom applications (7 copies  
from United Kingdom applicants  
should be sent not later than 10th April,  
quoting reference 1908/A (73)

UNIVERSITY OF EAST ANGLIA  
Norwich  
Applications are invited for the newly  
established post of  
**LECTURER IN  
MICRO-ELECTRONICS**  
The appointment will start as soon as  
possible. Candidates will be given to  
candidates with a suitable background  
in digital electronics or computing  
studies. Preference may be given to  
candidates with industrial or commer-  
cial experience in the design of micro-  
processor systems, their incorporation  
within industrial systems. Industrial  
products, or experimental systems or in  
the development of their applications.  
The salary will be at an appropriate  
point on the Lecturer scale (£6092-  
£10484 p.a. plus USS benefits).  
Applications (one copy) which should  
contain a full curriculum vitae, in-  
cluding exact date of birth together with  
the names and addresses of three  
persons to whom reference may be  
made, should be lodged with the Es-  
tablishment Officer, University of East  
Anglia, Norwich NR4 7TJ, from whom  
further particulars may be obtained  
telephone 0603 55181 ext 2128 by  
the 15th April 1980. No form of appli-  
cation are issued. In naming three  
references you are requested to give  
only the names of those who can  
immediately be approached by the  
University. (72)

## MYRIAD

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LONDON

£8000-£12000

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You must have a background in the computer industry, such as programming, analysis or any related sales oriented position. Without this essential grounding you could not be expected to give career advice to applicants or advise clients in major recruitment assignments. Under 30 you should possess the potential to succeed in highly sales oriented situations in which you will have the freedom to work very much on your own initiative.

The wide range of activities encompassed by the work will undoubtedly surprise you. You will also be interested in our training and career development. To find out the answers and much more about the varied and interesting life as a recruitment consultant, contact us to arrange an informal discussion and we will also tell you about the outstanding long-term career opportunities available.

AW1/1303

**MYRIAD APPOINTMENTS LIMITED**  
30 Fleet St London EC4Y 1AA Tel 01-353 0981 24 hrs

### THE CHINESE UNIVERSITY OF HONG KONG LECTURER IN COMPUTER SCIENCE (2 posts)

Tenable from August, 1980.  
Applicants should have a higher degree, preferably a Ph.D., in Computer Science or a related field. To teach Information Systems Analysis, Systems Design and Implementation and Data Structures, relevant experience and research interests in data organisation and retrieval, software design and management information systems preferred. OR to teach Computer Systems (Hardware and Software), Computer Organisation, Machine Structure and Assembly Language, Operating Systems, Compiler Design, relevant experience and research interests in two or more of the above topics preferred.

ANNUAL SALARY (in Hong Kong dollars and currently under review) \$67,920-\$77,040 by two increments \$8,160-\$11,120 by 7 increments. (Exchange rate 1 = HK\$11 approximately.) Starting salary and the grade to which the appointment is made will depend on qualifications and experience.

CONDITIONS OF SERVICE include superannuation benefits (University 15%, appointee 5%), medical benefits, education allowance for children, paid long leave, housing benefits (for local appointees at salary points above the bar on the Lecturer scale) and, for those employed on overseas terms, housing accommodation and air passages as well.

APPLICATION forms and further information are obtainable from the Personnel Section, The Chinese University of Hong Kong, Shatin, N.T. Hong Kong. Completed forms together with copies of recent testimonials and one set of major publications should be returned before April 30th, 1980. Please mark "Application" on cover. (67)

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In line with our rapid growth rate we have a continuous requirement for skilled and dedicated professional contract staff.

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USA, West Africa, Germany and UK

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**Assembler CICS or VTAM expert** Essex

**Cobol/CICS Analyst/Programmers**  
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**DOS/VS Systems Programmers** Middle East

**Systems 34 Analysts Programmers** City

**Univac 1100 Analyst/Programmers**  
London, Essex

**RPG Senior Programmers** Essex

**PL1 Analyst/Programmers**  
London, Home Counties

**IBM Cobol Analyst/Programmers**  
London, Home Counties

**Redifon Programmers** London



For more information telephone  
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£8000 - £10000

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### IBM Cobol/PL1/Mark IV

We are one of the top consulting companies in America. We have very recently opened our London office and have openings at most levels in system design, application programming, data base design and teleprocessing.

Our clients include banks, insurance, oil, commercial and industrial companies. The work is interesting and varied offering on-going training, career development and the option of 6-24 month transfers to one of our U.S. offices.

To arrange an interview (expenses paid) write now enclosing your c.v. or telephone Roger Barnes at:

**SOFTWARE DESIGN ASSOCIATES**  
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Telephone: 01-828 4200  
and at New York City, Chicago, Union NJ, Greenwith & Farmington CT, Philadelphia PA

# SDA

## Heads of Computing Services

Salary £11,181 x £255 (3) to £11,946 per annum.  
(Comparability award pending)

The County Council has the highest of reputations for progressive data processing and intends to utilise the latest technologies to the full in the future. There are at present two powerful computers, an IBM 370/155 and a DEC VAX 11/780, serving over 120 terminals of different kinds and a wide variety of applications for the County Council departments and other authorities in the area. There is, however, considerable demand for the provision of more computing services and plans are being finalised for the ordering of equipment and reorganisation of the Data Processing Division to meet the challenge of the future. The salary of the post is based on a proportion of the scale for Chief Officers of the Authority.

The Head of Computing Services is responsible to the County Treasurer for the management of the Data Processing Division and the co-ordination of all the Council's computing services and applicants should be well experienced in the senior management of large computer installations.

Excellent removal and resettlement expenses payable in approved cases.

Applications, with full details of experience, education and professional qualifications, together with the names of two referees, should be sent to the County Treasurer, County Hall, Chichester, West Sussex PO19 1RG, to reach him by 24th March, 1980.

## West Sussex County Council

## Hounslow

(London Borough of)

EDUCATION COMMITTEE  
Education Office, Civic Centre, Lampton Road  
Hounslow, Middlesex TW3 4DN

### RE-ADVERTISEMENT

Required for SEPTEMBER, 1980

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A teacher with substantial recent experience of teaching computer studies in secondary schools is required. The person appointed should be prepared:

- To advise on the choice of syllabus, its interpretation and to devise effective and efficient teaching schedules
- To co-ordinate the batch processing and computer terminal work on schools in the Borough
- To help teachers faced with technical, and other, problems in the use of these services
- To organise the in-service training of teachers who wish to teach Computer Studies

LONDON ALLOWANCE £408 PAYABLE  
CLOSING DATE 3 APRIL, 1980

Further particulars and application forms are available from the Director of Education, London Borough of Hounslow, Civic Centre, Lampton Road, Hounslow, Middlesex TW3 4DN, to whom they should be returned by the closing date (foolscap stamped addressed envelope, please).

The Education Committee has power to consider applications from experienced teachers for assistance toward removal, disturbance or separation expenses.

A GROVES  
Director of Education

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Please apply in writing, giving outline of current situation, qualifications and relevant experience to Brook P. Taylor or Roy J. Good, L'Esportel Avenue Princess Grace, Monte Carlo, Principality of Monaco.

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Univac site in Central London requires experienced data controller with sound knowledge of Exec. 8 and V.C.I. Days only. Ref. J2844

SHIFT LEADER-IBM to £6,800  
Installation on Surrey/London border are looking for a shift leader with several years' DOS Power/VS + CICS exp. Ref. C2874

SHIFT LEADER-ICL circa £5,800  
Small, friendly firm in Herts are currently looking for an ops with 2 yrs. + ICL exp. Ref. J2860

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City-based company are currently looking for an operator with £1700 exp. although other Burroughs knowledge will be considered. Ref. J2220

OPERATOR-IBM £6,000  
Central London site are looking for an operator with 18 mths' DOS/VS Power exp. Day and evgs. only. Ref. C2869

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**DATAPOWER**  
COMPUTER EMPLOYMENT LTD  
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## THE CHINESE UNIVERSITY OF HONG KONG LECTURER IN COMPUTER SCIENCE (2 posts)

Tenable from August, 1980.

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## Midland Recruitment Feature March 20th

For further  
details contact  
**Stan Harris**  
on 021-356 4838

## BOX Nos.

Box number replies should be addressed to:

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c/o Computer Weekly  
Dorset House, Stamford Street, London SE1 9LU

## SINGAPORE AIRLINES

require

## SYSTEMS ANALYSTS SYSTEMS PROGRAMMERS

to be based in Singapore

SIA recently installed two IBM 3031 and an ITEL AS/5 computers. Several on-line and database systems are being planned for implementation in the next few years. IBM software used include ACP/IPARS, IMS-DB/DC, OS/VS1, VM, CMS and APL.

Computer professionals who possess a University degree and at least two years' data processing experience are invited to apply for the positions of Systems Analysts and Systems Programmers based in Singapore. Applicants must be either Singapore or Malaysian citizens.

Salary will be commensurate with qualifications and experience.

Attractive fringe benefits include:

- \* free travel on company services during annual leave and concessional travel on attractive terms on other carriers; and
- \* free medical and dental treatment.

Applications containing full personal particulars including telephone numbers should be sent to:

Information Services Manager  
c/o Administration Manager  
SINGAPORE AIRLINES LIMITED  
580-586 Chiswick High Road  
London, W.4

before 27 March, 1980.



A team will be in London on 31 March and 1 April to conduct interviews.

Applicants should contact SIA London Administration Department at telephone number (01) 995 4901 for appointments.

## SINGAPORE AIRLINES

require

## COMPUTER PROJECT MANAGERS

to be based in Singapore

SIA recently installed two IBM 3031 and an ITEL AS/5 computers. Several on-line and database systems are being planned for implementation in the next few years. IBM software used include ACP/IPARS, IMS-DB/DC, OS/VS1, VM, CMS and APL.

To meet our plan, we are looking for computer professionals with a University degree and at least a few years' data processing experience at a senior level for appointment as Computer Project Managers. Successful applicants will be employed on a 3-year contract.

Salary will be commensurate with qualifications and experience.

Attractive fringe benefits include:

- \* free travel on company services during annual leave and concessional travel on attractive terms on other carriers; and
- \* free medical and dental treatment.

Applications containing full personal particulars including telephone numbers should be sent to:

Information Services Manager  
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580-586 Chiswick High Road  
London, W.4

before 27 March, 1980.



A team will be in London on 31 March and 1 April to conduct interviews.

Applicants should contact SIA London Administration Department at telephone number (01) 995 4901 for appointments.

Temworth Borough Council  
Borough Treasurer's Department

## COMPUTER PROGRAMMER

AP3 £4080-£4833 per annum

Applications are invited from suitably qualified programmers for the above new post in a small but busy section responsible for the operation of the Council's computer (an ICL 2904). Applicants should be familiar with COBOL and knowledge of ICL terminal programming language or ICL software would be an advantage.

The post offers the opportunity to broaden experience in a rapidly developing environment.

Fringe benefits:  
\* 100% removal expenses.  
\* £400 towards legal expenses arising from house purchase within the Borough area.  
\* Housing accommodation or £14 a week lodging allowance for 8 months.

Application form and job description are available from the undersigned. Closing date: March 28, 1980.

H. B. Leske, Town Clerk and Chief Executive, Municipal Office, Church Street, Temworth B79 7BZ Tel. (0827) 3581 Ext. 205.

(113)

## SOFTWARE HOUSE

needs

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## IBM DOS SHIFT LEADER

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A minimum of 2 years' DOS operating experience is a requirement for this Computer Services Co. based in C. London. Applicants will be self-motivated and conscientious, and should be conversant with both JCL and Utilities. The successful applicant can expect rapid promotional prospects. REF: JK1

## IBM OS VS1/MVS OPERATORS

VARIOUS to £8000  
We have a number of clients in C. London and the Home Counties who are seeking Operators with 12 months' + OS exp. Positions are available on both 370 and New Range 3030 Series equipment. Two of the vacancies currently available carry subsidised MORTGAGE. REF: JK2

## IBM NETWORK CONTROLLER/ SCHEDULER (DAYS)

W. LONDON to £8000

## IBM TERMINAL CONTROLLER (DAYS)

CITY to £8000  
Major commercial concern with IBM Mainframe Operation based in W. London is seeking to recruit persons for the above vacancies.

For the position of Network Controller, an experienced Shift Leader/Sen. Op. is sought with a good DOS VS POWER VS background and a thorough understanding of the CICS TP System.

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Eastern Gas use a number of minicomputer and microcomputers for Distributed Telemetry and Control and for Message Switching. These systems operate over a large private microwave radio network which provides all the Regions Speech and Data communications services.

A qualified person is required within the Data and Computer Group to assist in the expansion, development and replacement of these digital systems. The duties will involve the design and realisation of "stand alone" programs through to complete systems for various computers ranging from large minis to microprocessors. The work will also involve the selection of computer hardware, peripheral equipment and software packages. Candidates should preferably be educated to degree/H.N.C. level with a minimum of two years Assembler experience. A knowledge of CORAL 66 will be an added advantage. Some travel will be involved and a current driving licence is essential. Salary within the range £6249 to £7392 plus £415 Metropolitan Weighting.

Application forms quoting ref. 1600 CW can be obtained from the Senior Recruitment Officer, Eastern Gas, Star House, Mutton Lane, Potters Bar Herts. EN6 2PD. Telephone Potters Bar 51151 Ext 485. Closing date for applications 27 March 1980.

## EASTERN GAS

## Computer Manager Analyst Programmer

R. White & Sons Limited, the soft drinks division of Whitbread, presently have vacancies for a Computer Manager and an Analyst/Programmer in their modern EAST LONDON headquarters.

Our hardware consists of an ICL 2904/50 with EDS 60's communicating with a number of depot and factory locations throughout the U.K. via a terminal system driven by two ICL 7502 mini computers. The main systems installed include supply control and management reporting, and plans exist for further major developments.

### Computer Manager c. £9,500+car

This position holds responsibility for the smooth and efficient running of our computer section.

Applicants should have a minimum of 3 years experience in both COBOL programming and systems analysis, preferably with an ICL hardware background.

In addition applicants should be able to demonstrate experience in man management and project control. This position may suit a Senior Analyst/Programmer who wishes to progress further into computer management.

### Analyst/Programmer c. £6,500-£7,000

The ideal candidate will have 2 years COBOL programming experience, backed up by 1 years systems analysis work. A general commercial awareness is essential and any business planning knowledge would be advantageous.

In addition to attractive salaries the Company offers a wide range of fringe benefits as befitting to a member of the Whitbread Group.

For further information or an application form please contact:  
Miss D. G. Sharp, R. WHITE & SONS LIMITED,  
Winsor Terrace, Beckton, London E6 4LF.  
Tel: 01-474 9200.



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Ring Ray Kelly for further details on 01-261 8016.

# COMPUTER WEEKLY CLASSIFIED

01 261 8028/8097/8019

the newspaper computer people rely on

01 261 8028



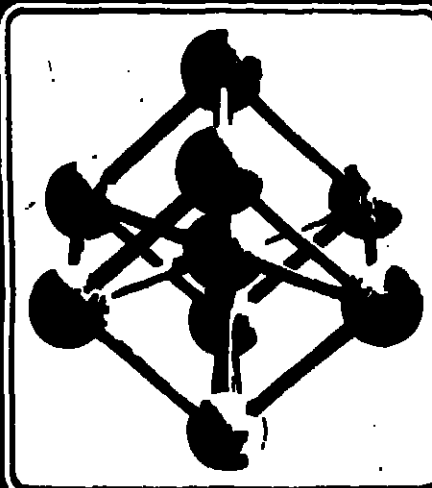
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17

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LONDON BASE

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These are attractive opportunities for well qualified professionals to join a large and highly reputable international consultancy, working within the field of advanced technology. You will be expected to possess experience in the following areas:

1. A sound systems background having worked with or led a major project from the feasibility stage through to full implementation.
2. Experience in working with Database Software — such as IDMS/DLI/TOTAL is essential.
3. French or Dutch as a second spoken language would be advantageous.
4. Experience gained from designing financial systems, although not essential, is desirable.

CALL US NOW (24-HOUR ANSWERING SERVICE) OR  
WRITE TO US TO OBTAIN MORE INFORMATION ABOUT  
THESE OPPORTUNITIES

### Cambridge City Council SYSTEMS ANALYST (Re-Advertisement)

(Salary up to £8,090,  
with Comparability  
Award pending)

An additional Systems Analyst is required to join a small team within the City Treasurer's Department. The Council operates an ICL 2904 with EDS 80's and two 7502's serving enquiries and ICL's new Counter Terminal System.

The main development in the next two years will be a Management Information System running under Database Management Software. Further information is obtainable from the Computer Manager, D. Smith, (0223-358977 Ext 284).

Relocation and assistance with housing accommodation are allowed in approved cases. Other benefits include flexible and self restaurant.

Applications giving full details of experience and qualifications must reach the undersigned by Monday 31st March 1980. Previous applicants need not re-apply.

City Treasurer, Guildhall,  
Cambridge CB2 3QJ. (176)

### BOX Nos.

Box number replies should be addressed to:

Box No. ....  
c/o Computer  
Weekly  
Dorset House  
Stamford Street  
London SE1 9LU



### MICHELIN

### SWITCH TO MICHELIN SENIOR ANALYST- PROGRAMMER

MANAGEMENT SERVICES DEPT., LONDON, S.W.3

Michelin, the leading British radial tyre manufacturer, wish to recruit a Senior Analyst Programmer to be a project leader, with direct responsibility for the analysis, design and programming of Commercial Computer Systems.

The work involves some liaison with the main-frame installation at our Stoke-on-Trent Manufacturing Headquarters and Commercial offices throughout the U.K.

Good experience of analysis and programming essential. Sound training in programming on manufacturers or equivalent courses is essential, which should have included COBOL.

Age range: ideally over 25 years with a minimum of 5 years' experience on Honeywell/IBM/ICL Computer equipment in an industrial Commercial environment.

Michelin offer an individually negotiated salary to attract the calibre of Senior Analyst-Programmer required; five weeks' paid holiday plus statutory holidays; free life assurance and contributory pension scheme.

Above all we offer a career associated with first-class products renowned for their quality, together with effective Personnel Policies.

Please write in confidence giving details of age, work experience, qualifications and current salary to:

The Personnel Manager—Commerce  
(Ref. JFG/BA/1/80)  
MICHELIN TYRE CO. LTD.  
81 Fulham Road, London SW3 5RD  
or Telephone 01-889 1460 for an application form. (106)

### GMC Greater Manchester Council COUNTY ENGINEER'S DEPARTMENT

### URBAN TRAFFIC CONTROL

This County Engineer has now taken delivery of the central computer which is the "heart" of the UTC scheme. There will be over 600 sets of signals on line covering the whole of the GMC area.

As the project is entering the implementation stage the computer and traffic management (signals and network) are being combined and expanded and the following staff are now urgently required.

### CHIEF ENGINEER— Special Grade

£8657/£10,170 p.a.

To control a staff of (approximately) 25 and be responsible for the installation, management and development of the systems. Applicants should hold a professional qualification and considerable relevant experience (not necessarily within Local Government).

### SECTION ENGINEER (Systems-Hardware)

P01 (8-10) £7125/£7908 p.a.

Responsible for the work of the Hardware Team and to contribute to future development plans. Applicants will be experienced staff managers, suitably qualified with experience in electronics, computer hardware and data transmission.

### ASSISTANT PROGRAMMER

AP3/5-£4080/£5447 p.a.

To assist with further development of the system software. A knowledge of CORAL 66 would be useful but is not essential. Conditions of service include removal, legal etc. expenses up to £750; lodging allowance; generous leave entitlement. Pay award pending on all posts.

Application form, job description and further details available from the County Personnel Officer, County Hall, Piccadilly Gardens, Manchester M60 3HP. Tel. (061) 247 3328/9. Closing date — 31st March. (106)

### CLASSIFIED COPY

All classified copy should reach our offices no later than 3.30 p.m. on the Monday preceding Thursday's publication.  
If complete artwork is supplied, 1.1 a.m. on a Tuesday.  
Ring Ray Kelly for further details on 01 261 8016

## NORTH WEST

### S. MANCHESTER to £8000

**ANALYST/PROGRAMMERS**  
This professional and highly successful consultancy requires further Analyst/Programmers with over 3 years IBM experience. This should include COBOL or PL/I with CICS and/or DLI exposure. First rate jobs with excellent prospects.

### CHESTER £ NEG.

**SYSTEMS ANALYSTS**  
This major organisation is undertaking large development plans and require Analysts with 3 years experience of a general commercial or production nature. Multi-machine environment.

### PEAK DISTRICT c £6500

**SENIOR SYSTEMS ANALYST**  
Our client is seeking an Analyst with 3 to 4 years general experience to work on on-line and advanced data-base systems. Progressive company with good prospects.

### PRESTON c £6400

**SYSTEMS ANALYSTS**  
Expanding installation require 2 further Analysts with a commercial background to work on the latest hardware utilising sophisticated on-line/data-base techniques.

### CHESTER £ NEG.

**COBOL PROGRAMMERS**  
If you have around 2 years COBOL experience gained on any hardware, and preferably but not essentially some manufacturing/production applications experience, our client will negotiate a very attractive package.

### MERSEYSIDE to £6500

**PROGRAMMERS, SYSTEMS ANALYSTS**  
As a result of further expansion, an client urgently requires D.P. professionals with over 2 years experience. IBM COBOL for the Programming positions is required together with a commercial analysis background for the Systems Analyst posts.

### PRESTON to £6500

**SENIOR PROGRAMMERS**  
Our client has recently installed new hardware and is seeking Programmers with over 2 years COBOL and some on-line exposure. The installation is expanding dramatically and offers excellent prospects.

### CHESHIRE from £8000

**IBM PROGRAMMERS**  
COBOL or PL/I Programmers with some on-line or data-base exposure are urgently required by one of our major clients. You should have over 3 years commercial experience and wish to carve out a career with this company.

### MANCHESTER/CHESHIRE to £8500

**REAL-TIME PROCESS CONTROL**  
Our client requires Programmers and Systems Designers with industrial control experience typically on PDP, INTEL and ZILOG using CORAL, RTL11, etc. These positions offer excellent salaries dependent on experience, and real job satisfaction.

### MERSEYSIDE c £8000

**SENIOR ANALYSTS**  
If you can combine a good academic record with over 3 years large systems experience our client can offer exceptional prospects. Developments are diverse and are of a highly sophisticated nature.

Contact STEVE SYKES on Leeds (0532) 444186 (daytime) or on Leeds (0532) 662417 (evenings and weekends) or write to the address below.

## MIDLANDS VACANCIES

### BIRMINGHAM c £7800

**PROJECT LEADERS**  
Our Client, a chemical manufacturer is currently seeking project leaders who can lead a team of 6 people. You will have experience in production control systems and have implemented at least 1 major system.

### ANALYST/PROGRAMMERS BIRMINGHAM c £6750

A major manufacturer needs analyst/programmers with a minimum of 2 years experience who are capable of systems design and program specification to develop new systems.

### BIRMINGHAM c £4500

**PROGRAMMER**  
This company is looking for a programmer with about 18 months experience of COBOL. You will be writing programs from specifications and will be taught to use large ICL New Range equipment with on-line and data base facilities.

### HINCKLEY to £7500

**ANALYST/PROGRAMMER**  
A major company in the service industry is currently seeking an analyst/programmer to assist in the development of an on-line system. You will have a minimum of 1 year's experience in analysis and 2 years COBOL programming.

### HINCKLEY to £8000

**PROGRAMMER**  
A major servicing company requires a COBOL programmer with a minimum of 12 months experience. You will be trained to work on a new computer with on-line facilities with superb working conditions.

### COVENTRY to £8000 + O/T

**SYSTEMS ANALYSTS**  
A large manufacturing group needs analysts with a commercial and/or production background. They offer superb working conditions and excellent career prospects.

### WALSALL to £7000

**SYSTEMS ANALYST**  
This company is in need of a systems analyst to develop new systems. You will have a good track record and preferably experience of accounting, personnel or word processing systems.

### ANALYST/PROGRAMMERS HALESOWEN c £6500

A computer manufacturer is looking for two analysts/programmers to work in pre and post sales support. These people will have a good commercial background and a willingness to get involved.

### BIRMINGHAM c £6000

**ANALYST/PROGRAMMER**  
A retail organisation has taken delivery of an ICL 2904 and would like to employ an analyst/programmer to assist in the development of new commercial systems. You will have to be dynamic and self-motivated.

### CANNOCK to £8500

**PROJECT LEADER**  
Our client, a large engineering company is seeking an experienced systems analyst to work in the role of business analyst/project leader. You will be able to demonstrate these qualities and have a successful track record.

### WARLEY c £5500

**PROGRAMMER**  
This company needs a COBOL programmer who can show good experience. Knowledge of ICL 2904/DMC Data Driver and/or T/M an added advantage.

### HALESOWEN to £5500 + exp. allowance

**PROJECT LEADER**  
If you have the ability to be a successful project leader and want to work in a demanding environment, and have good experience of commercial applications, then this computer manufacturer will offer a good salary and an exciting environment.

Please PETER GILBERT on LEEDS (0532) 444186 (daytime) or on BRADFORD (0274) 854074 (evenings and weekends) or write with brief details to the address below.

**LORIEN**  
COMPUTER SERVICES

Recruitment Consultants  
Of 5 Home Service Road Leeds LS7 9PL  
Telephone 0532 114185  
24 hour telephone service